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Dell Dimension™ T Series photographed with options:
17" flat panel monitor and Altec Lansing ADA 880 speakers.



Dell Inspiron™ 5000



Dell Precision™ 220 pictured with
optional 17" flat panel monitor



Dell PowerEdge™ 2400 Server

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AWARDS

Australian PC Buyer

November. The Dell Dimension 1500c was rated #1 in the Value Desktop Category.
December. The Dell Dimension 1500c was rated #1 in the Business PC category.

Australian PC World

November. The Dell Dimension 1500 won #1 in the Home Best Buy category.
January 2000- Dell Dimension XPS 1700 was rated second in "Best Home and Business PC"
January 2000 - Dell Dimension 1500c was ranked second in "Best Business PC Buy"

Top products of 1999

The Dell Dimension XPS 1500 was rated The Best Home PC of 1999 by the editor and readers alike.

Australian PC Authority

T550 won a "Recommended Award".
December. The Dell Dimension T550 won a "Recommended Award".
January 2000- Dell Dimension XPS T550 was named "Ultimate PC".
February 2000- Dell Dimension XPS T550 received the recommended award for the ninth month in a row.
February 2000 - Dell Inspiron 3700 awarded Excellence Award
February 2000 - Dell Dimension XPS B733 received the speed award in the Super PCs category

Internet .au

April 2000- rated the Dell Latitude LS as top of its "Hot Products" section

Australian Personal Computer

December. The Dell Dimension T550 won "Editors Choice Award".

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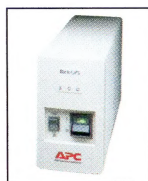
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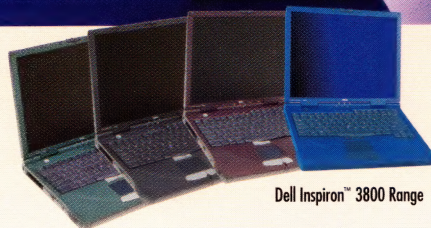
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- 3.5" 1.44MB Diskette Drive
- High-fidelity Audio SoundBlaster Compatible
- 24X Max Variable CD-ROM Drive
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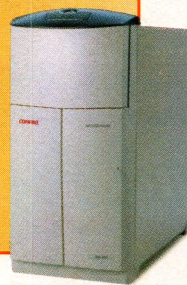
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Entertainment PCs

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PDA's

2 Whether they've gotten smaller than a paperback or developed almost as much power as a PC, Personal Digital Assistants have come a long way over the last year. Find out what's hot and what's not, what's changed and what remains the same, in our in depth PDA road test.



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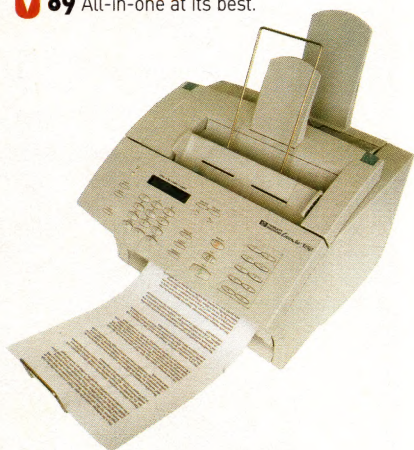
Our free giveaway on this month's CD is a full working version of **trueSpace 3/SE** - create fantastic animations, illustration and 3D models on your PC - for FREE! We also have trial versions of **Norton Internet Security 2000**, **HomeSite v4.5** and **Namo WebEditor 3.0**. There's also **BeOS 5 Personal Edition** - a full alternative OS to Windows. Our game demo this month is of **Majesty: The Fantasy Kingdom Simulation**.

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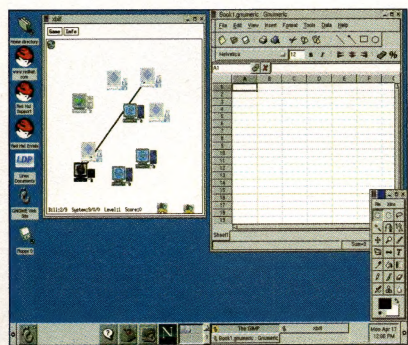


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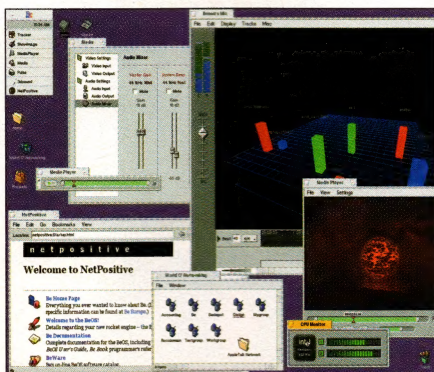
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On the CD

PC Authority and Caligari are proud to offer you trueSpace 3/SE, valued at \$499, absolutely FREE!

trueSpace 3/SE

Requires Pentium class processor, 16Mb of RAM, Windows 95/98/NT 4 **Restrictions** None **Contact** Caligari www.caligari.com

Caligari's trueSpace 3/SE is a complete 3D modelling and rendering package. TrueSpace is the ideal tool for creating spectacular 3D images for Web pages, video animations and illustrations. It includes an excellent range of modelling tools, including Boolean operations, point, line and face editing and object deformation. **For a quick guide to this product visit the CD pages on the PC Authority Web site at www.pcauthority.com.au**

Namo WebEditor 3.0

Requires Windows 95/98/NT 4.02, 10Mb of free hard disk space, 32Mb of RAM **Limitations** 20 day trial **Contact** TradePlus International (03) 9890 0997

This full-featured visual Web editor features over 70 stunning templates to choose from allowing you to concentrate on content and design. This version also includes a built in site manager, FTP tool, extensive clip art gallery, GIF animator and support for DHTML and CSS.

Majesty: The Fantasy Kingdom Sim demo

You're king of your own fantasy empire with Majesty: The Fantasy Kingdom Sim. As king you are required to complete quests to vanquish your enemies, mythical beasts and the strange creatures you meet on the way.



Image by K. Lehtinen



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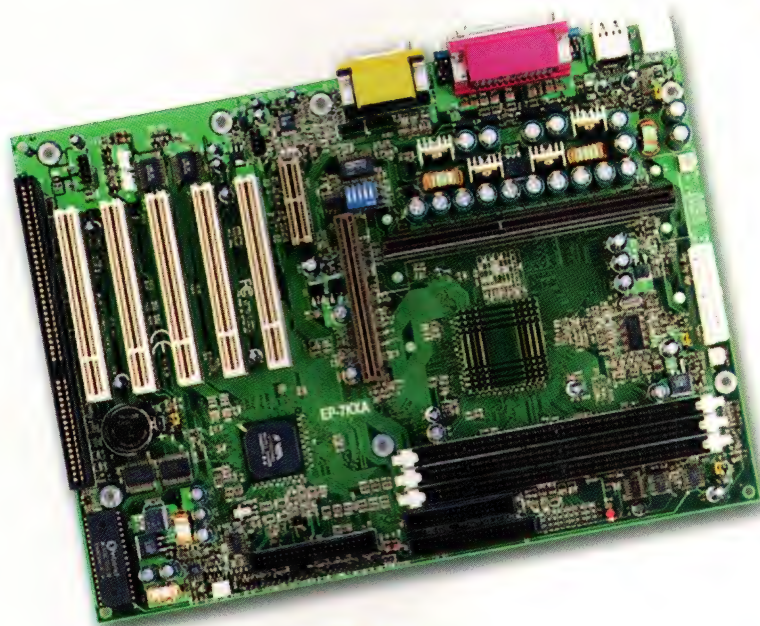
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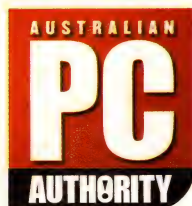


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PC Authority welcomes all information on new and upgraded products and services for possible coverage within the news or reviews pages. However, we respectfully point out that the magazine is not obliged to either review or return unsolicited products. The editor is always pleased to receive ideas for articles; preferably sent in outline form, with details of author's background, and - where available - samples of previously published work. We cannot, however, accept responsibility for unsolicited copy and would like to stress that it may take time for a reply to be sent out.

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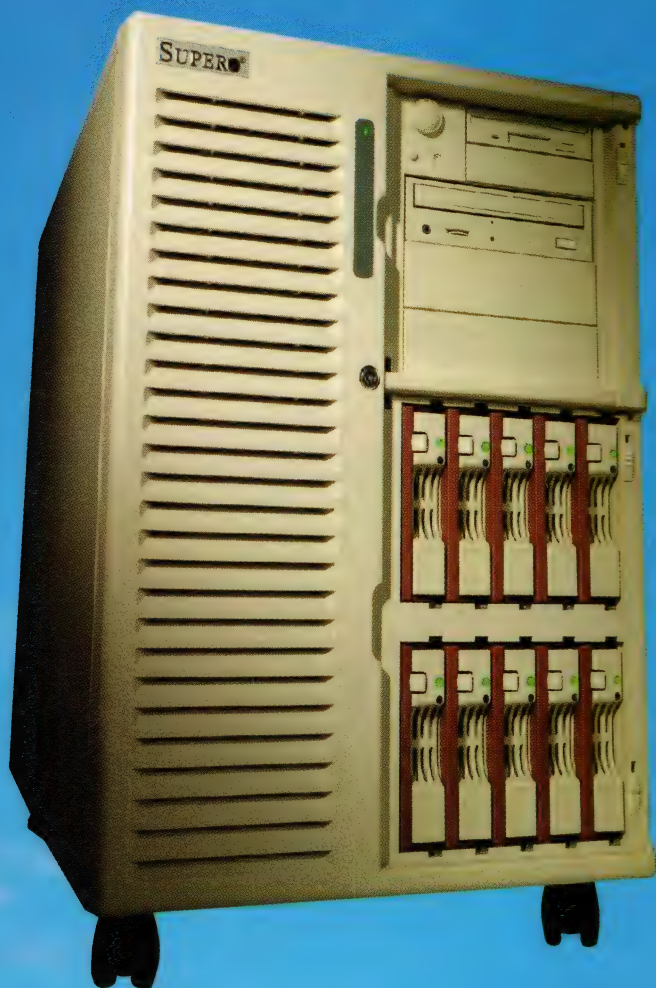


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The new music

MP3 piracy is running rampant on the net, but should we stop it?

Login

You don't have to buy music anymore. You can log onto Napster (www.napster.com), hunt through the hundreds of thousands of hard drives connected to this 'virtual swap meet', and download just about any song that you can think of. Of course, don't forget to bring your own MP3s to the party so others can download the music that you've got on your hard disk. If you have a CD recorder, all you need to do next is convert your MP3s into .WAV format and burn them onto a CD. And there you have it - custom made CDs that you can play anywhere, and it didn't cost you a thing for the music.

Yes, this is what all the fuss is about. The Recording Industry Association of America (RIAA), and musicians Metallica and Dr. Dre have all filed lawsuits in the American Federal court against Napster for providing a medium that makes such gross breaches of copyright possible. And who would blame them? They're fighting against the theft of intellectual property after all, where music labels, distributors and artists could lose out on quite a bit of money.

Metallica has even gone as far as to sue Yale University, the University of Southern California (USC) and Indiana University for allowing students access to Napster on their campus Internet connections. In response, Yale and Indiana have banned Napster from their services, and USC has imposed heavy restrictions, allowing Napster to be used only for lawful purposes under direct supervision by University staff.

With such a considerable amount of legal muscle bearing down on Napster, why would it even consider making a stand for itself, and not simply slither back beneath the rock from whence it came? Because Napster is a business that makes money, that's why, and it's not going to stop making money until it has to. Also, under the US Digital Millennium Copyright Act (DMCA) passed two years ago, an ISP is not held liable for the material that passes through its servers. This means that AOL, for example, is not responsible for what its customers do on the net, be it trade child pornography or post death threats. However, it is obligated to bar members, who are personally liable for their crimes, from using its service. By the same vein, although Napster enables people to swap MP3s, it shouldn't be held liable for pirated MP3s that are traded - this liability should be held with the individual.

Since Napster refuses to censor what people trade across its service (citing the DMCA in its defense), it did agree to ban members who could be identified as actively trading copyrighted material. Napster had actually revoked the memberships of some people in the past for enormous downloads of pirated material. In an interesting turn of events,

on May 3rd, Metallica obtained a list of 335,000 people who downloaded their copyrighted MP3s with Napster over the previous weekend. It dumped the 60,000 page document that identifies all of the offenders on Napster's doorstep demanding that it ban them from its service. As of yet, Napster is still reviewing the list of members and is considering its next step.

On May 2nd in an ArtistsDirect chat on Yahoo!, Metallica assured fans that it wanted to stamp out Napster, not sue the little people for each and every copyright infringement. When addressing a solution to the problem, band member Lars Ulrich mentioned 'some kind of monitoring or policing of the Internet' in order for musicians to receive the payment that they're entitled to for use of their music.

Unfortunately, in an age where successful musicians are paid more for an album than what many people make in a lifetime, there's little public sympathy for the plight of the starving rock star. In terms of ethics, is downloading a copyrighted track from Napster the same as stealing a CD from the shelves of a record store? No, I really don't think that it is. I imagine that a huge percentage of the people using Napster have never walked into a store and stolen a CD in their lives. The Internet provides anonymity and safety in numbers, and Napster makes music available for the taking. Add to this the general lack of concern about depriving enormously wealthy bands out of a few bucks and what do you get - a bunch of thieves? No, you get a comment on human nature.

In essence, this entire debate casts light on the monster that the music industry has become. Its real purpose is secondary to promoting artists, but rather the manufacturing of 'perceived' needs and the creation of products such as the Popstars (ok, Bardot) that are sold for top dollar to the public.

Even if Napster is drummed out of business, there are already ingenious Napster spin-offs such as Wrapster, iMesh, Spinfrenzy and Gnutella that can't be pinned to a central server and can spontaneously appear and disappear without a trace. This means that unless our personal Internet privacy is seriously compromised, the efforts of the RIAA, Metallica and others to stop MP3 piracy are fruitless regardless of how justified their plight is. This may mark the beginning of the end of the music industry as we know it. I'm sure that people will still buy CDs and pay for videos and concert tickets, but the net may bring back to earth the high-flying executives and artists who've flown first class for too long and may now have to put up with economy like the rest of us. ☹

Valens Quinn

**'...is
downloading a
copyrighted
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same as
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record store?'**

SONY

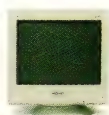


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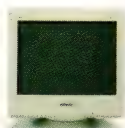
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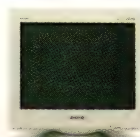
E200 - 17"



G400 - 19"



G500 - 21"





Horizons

PC Authority seeks out all the latest news in the world of technology from local trends to global breakthroughs.

Microsoft guilty

In a 17-page proposal put to Judge Jackson, government prosecutors have finally made up their minds over what to do to Microsoft in order to reduce its power and control of the market. The government has now officially requested that the corporation be divided into two competing companies - one dedicated to applications and the other to operating systems. Under the plan, the 'Applications Business' would own and control successful products such as Microsoft Office, Internet Explorer, BackOffice, SQL Server, MSN, MSNBC, and 'all investments owned by Microsoft in partnerships or joint ventures'. While the 'Operating Systems Business' would have the OS products for hardware devices such

as servers, handheld devices, PCs based on the Intel x86 architecture and other microprocessors and TV set-top boxes.

US government officials believe that by separating the company and having extremely popular products such as Windows and Office in opposing parts competition would immediately begin, leading to new life in the industry. As Assistant US Attorney General Joel Klein suggested, the breaking up of Microsoft would 'revitalize competition in the browser market, which the court found Microsoft tried to monopolise'. Industry experts, however, suggest that this is yet another example of the US government's lack of understanding of the industry, and

that the suggested penalties would become obsolete almost immediately in this industry.

Even if this proposal is approved though, it will be a considerable amount of time before any division can actually take place. Until then, US government attorneys wish to place restrictions on Microsoft's activities, again to open the market and reduce Microsoft's gargantuan market dominance. Restrictions suggested included limiting Microsoft's ability to discount copies of Windows and other products in order to achieve a higher distribution of such products; reorganising the management structure to include and closely integrate a compliance department and Chief Compliance Officer to ensure the company is properly

adhering to the new government rules; allowing state and federal government attorneys to enter Microsoft's buildings and inspect and question without restriction, while all emails created and received by all Microsoft officers, managers and directors would be kept for inspection for at least four years.

Furious at the enormity of the possible punishments, Gates attacked the lack of market comprehension by the US government. 'People can disagree about some of the issues in this case, but the government's proposals are clearly unreasonable and punitive beyond reason. These regulations are out of touch with consumers and are completely out of proportion to the issues in this case.'

Pop! goes the tech stocks

Friday April 14 saw the long-predicted fall of technology stocks on Wall Street and consequently around the world. Panic was prompted by the release of unexpectedly high US inflation information, which raised the possibility of interest rate rises liable to hurt the market.

On the day - which is now being referred to as 'the day the bubble burst' - general stock markets were affected when the Dow Jones Industrial Average fell 617.7 points,

or 5.6 per cent, which was the largest single points fall for the index. Percentage-wise it did not come near the 22 per cent drop in 1987. Worst affected was the tech-dominated Nasdaq index which fell 355 points down to 3,312.2, a drop of 9.7 per cent and the largest ever in its 29-year history.

Although hesitant to call it a crash, Australian market experts spent the weekend bracing themselves and waiting for

the Australian stock market's delayed reaction on the following Monday. After a rough morning, at close of Australian trading on the Monday the All Ordinaries had dropped 576 points with a large number of Australian tech companies recording losses of 30 per cent or more.

Despite the overall losses recorded

in the first days following the crash, analysts predicted that although things were not good, they were as low as they were likely to go at this time. After a few 'aftershock' downturns, analysts reported that 'it's just a matter of time before the markets make it back to the heady heights investors enjoyed prior to the fall.'



Chip wrangling

The rivalry between long-time graphics chip competitors S3 and nVidia Technologies has ended amicably with S3 transferring its graphics chip business to a newly established joint venture between the two companies. The transfer has left S3 with the opportunity to focus on its re-launch as Internet appliance company, and nVidia with an even stronger hold on the graphics sector.

S3 released its graphics chip business to the joint venture and will sell three million shares of its stock to VIA in exchange for \$US323 million in cash and securities, and is set to receive additional earn-outs if 'certain financial milestones are achieved by the joint venture'.

Surprisingly each of the companies respective licensing deals (S3's with Intel and nVidia's with SGI) are not included in the venture. Despite this analysts see the agreement as threatening for other graphics competitors. 'It's probably the worst news for 3Dfx, which is kind of struggling. 3Dfx right now is acting like it doesn't care, but that seems crazy,' said Kathleen Maher, Editor-In-Chief of the recent Peddie Report on the graphics industry.

While nVidia is happy to be the strongest player in the graphics chip market, S3 is relishing its chance to tackle its future as an Internet appliance supplier for the digital home. 'Today's

announcement opens a new chapter in S3's history as we refocus our resources on our Internet appliance businesses, designed to enable the digital home,' said Ken Potashner, CEO and Chairman of S3. 'I clearly believe that the new S3 is well positioned to seize the opportunities in its path, win in its target markets and grow at a rapid pace.'

Industry analysts too, viewed the agreement as beneficial for both companies, but particularly so for S3; 'The growth opportunity for S3 as an Internet company far outweighs that offered by PC graphics chip products,' said Dan Scovel, Semiconductor Analyst for Needham & Company.

Corel in the picture

Aiming to strengthen its position in the competitive Macintosh graphics market, Corel has acquired several professional graphics software applications and technologies from MetaCreations.

Products acquired in the deal include Kai's Power Tools (KPT), KPT Vector Effects, Bryce and Painter. President and CEO of Corel, Dr Michael Cowpland, sees the acquisition complementing Corel's existing product range, which includes CorelDraw, as well as strengthening its position in the Macintosh graphics market.

'The acquisition fits our strategic vision of offering world-class

applications for multiple platforms,' explained Dr Cowpland. 'Corel is committed to developing new versions of the Painter, KPT and Bryce product lines and supporting the existing customer base worldwide.'

In an attempt to meet this commitment and ensure a smooth transition of the MetaCreations Painter from company to company, Corel has contracted the creators of the application to assist in the product's development.

The acquisition comes in light of Corel's recent commitment to the development of graphics software for Linux. The company's plan is to make

the operating system a more appealing environment for graphic designers and in turn boost Linux's standing in the Windows-dominated OS market.

Corel is realistic, however, in its support for the cult-favourite OS. 'At this stage in the game, it's more of the graphics environment itself that Corel's looking to improve,' a spokeswoman explained. 'After that, the market will come.'

But before greater focus can be given to Linux development and support, Corel will be giving priority to Macintosh and Windows users of the acquired MetaCreations software.

Sony Piracy

Sony has launched 48 civil cases and eight criminal investigations in a major crackdown on software piracy in Australia. The company has also exercised six Anton Piller orders (civil search warrants), which give it the power to search premises for counterfeit software, and is now talking with the Commonwealth Government about the possibility of enlisting the assistance of the Australian Taxation Office.

There are more than 65 defendants involved in the 48 civil cases where there is evidence of CD

counterfeiting being run by organised groups. Meanwhile, the first of the criminal cases involving software piracy resulted in Michael Oakley being fined \$17,000 in a Gosford Court for selling and possession of counterfeit copies of Sony PlayStation games. Oakley was charged after federal police raided his Kincumber, NSW home in October last year and seized hundreds of counterfeit PlayStation CDs.

Sony's antipiracy campaign was launched in June last year at a cost of \$1 million a year and so far 550

reports of PlayStation game piracy have been received. The investigations involve teams of lawyers, investigators, customs officials and state and federal police. So far at least 30,000 counterfeit CDs, valued at \$1.8 million in lost sales, have been seized by Customs and police.

All of the civil cases have been launched in the Federal Court and 17 have already been settled with Sony being awarded more than \$100,000 in damages and costs.

www.playstation.com.au

IN BRIEF

Pay premium

The average IT salary continued to rise throughout 1999, despite a reduction in demand for staff due to Y2K. The average salary was seen to increase by more than nine per cent during the year, with Web developers scooping the biggest rises overall, according to the Factual Salary Survey (FSS).

Dell dosh

Despite issuing a profit warning following its chip-supply problems with Intel, Dell has announced improved profits of \$US436 million for Q4 of 1999. Dell claims that its worldwide product shipments grew at more than double the industry rate in that particular quarter.

Gold up for grabs

Iomega is celebrating the dispatch of its 200-millionth Zip disk by offering customers the chance to win an 18-carat solid gold replica of the disk. The 200g disk is being kept under lock and key in Switzerland until the winner is chosen.

www.iomega-europe.com/wgolddisk/

Eastern promise

Telecommunications provider Lucent Technologies is making inroads into China after winning contracts worth \$US100 million from local ISPs. Sixty per cent of the value of the contracts comes from China Unicom, the country's second biggest telecomms provider, and includes expansion of its GSM mobile phone system and the introduction of ATM technology to its backbone.



IN BRIEF

Sensible solution

National Semiconductor is aiming to mimic the human senses with a system based around its COP8 family of chips. A board fitted with a chip and a gas and smoke detector represented the sense of smell, while the company's Web Pad represented the sense of touch by virtue of its LCD. Both devices were on display at the Embedded Systems Show 2000.

I'll be FTCing ya

Online bookseller Amazon is in hot water following allegations that it's breached the privacy of its customers. The company's subsidiary, Alexa Internet, has come under scrutiny from the FTC (Federal Trade Commission) following claims that its software 'grabs' personal data and passes it on to Amazon. Both companies deny the claims.

Novell numbers

A Y2K-related slowdown is, yet again, to blame for Novell's below-par revenues for the quarter ending 31 January. The company used cost-cutting measures to record a net income of \$US44.8m, up 55 per cent on last year but below analysts' estimates.

Sintel alliance

Chip giant Intel is teaming up with Sony to ease the transfer of data between PCs and devices such as digital cameras, camcorders and MP3 players. The pair plan to integrate Sony's Memory Stick technology into PCs as part of the initiative.

Charmed to meet you

Awkward introduction and enforced small talk could be stamped out at business conferences if smart badges from US startup InfoCharms take off.

The trekkie-style badges allow conference attendees to program in secret codes revealing their own demographic information and interests, and will wirelessly communicate with other attendees. 'The charmed badge will automatically exchange business cards as well as performing affinity matching. It could direct [other attendees] to a Web page with your contact information,' says Alex Lightman, CEO of InfoCharms.

The 2.5in-diameter badges are based on InfoCharm's proprietary OS, Nanix, which is based on a version of the Linux OS.

Lightman is, however, keen to disassociate Nanix from other commercial versions of Linux. 'This is a consumer-friendly version of the OS. Red Hat Linux is 600Mb,' says Lightman, who claims that the badge runs on just 16Kb of memory.

The badges are due to go on trial at the Everywhere Internet show in San Francisco, but the company is



hoping to reach mass production by mid-2000. Achieving mass production will allow InfoCharms to produce the badges for less than \$US10. 'We're hoping to sell sponsorship and

encourage companies to put their logos on the badges,' says Lightman.

Future versions of the charmed badges will include speech control and context-sensitive interfaces and could be used to monitor health.

For further information about these badges, see www.infocharms.com

Sky's the limit

British researchers are aiming for membership of the mile-high club with an environmentally-friendly scheme to boost mobile and fixed Internet connections.

The team, based at the University of York, has joined the worldwide HeliNet research network, a programme dedicated to creating High Altitude Platforms (HAPs). The HAPs will take the form of unmanned, solar-powered planes and hot-air balloons that will fly higher than Concorde but lower than Low Earth Orbit satellite communications.

Researchers claim that the HAPs will be more environmentally friendly and efficient than conventional communications systems. 'There are

many advantages compared to terrestrial infrastructure, [for example] you don't need masts or fibre. One airship over London should be enough,' says David Grace, a research fellow and part of the university team.

Once in place, the HAPs could provide access for mobile phones as well as a high-capacity broadband feed. 'In the next couple of months we're hoping to see international mobile phone frequencies allocated for High Altitude Platforms. In the broadband space we're hoping to go up to



155Mbps/sec,' says Grace.

Prototypes of the technology could be demonstrated by 2003, to be followed by working systems two years later. However, Grace believes that could depend on the weather. 'Rain can cause the systems to get lost, and you have

to take that into account when you're designing your system. It doesn't mean you can't do it, it just means you need to be more careful,' he says.

We'll keep you posted on any further developments.

www.helinet.polito.it/

Memory lapse

Chip giant Intel has suffered another major blow to its plans for supporting high-capacity memory Rambus after the discovery of a bug in its 820 and 840 chipsets.

The bug is affecting servers and workstations containing the high-end 840 and 820 chipsets and, says Intel, stems from problems with their two ancillary chips: the Memory Repeater Hub (MRH) and Memory Translator Hub (MTH), respectively. The error occurs when a system also supports Error Correction Code (ECC)

technology, which prevents data from corrupting as it moves between the chip and other components.

Intel claims the bug only occurs in specific situations. 'This is a very specific problem and occurs when you've got a configuration using SDRAM. It happens when you translate Rambus into SDRAM. In extreme cases it can cause the system to hang,' says Graham



Palmer, a spokesperson for Intel.

Rival motherboard manufacturers are sceptical over Intel's explanation,

however, claiming that their products are working fine. 'The problem affects their motherboards. It's the way they've designed them. Intel's withdrawing the boards because of the MRH. Our [SuperMicro] boards are using the MRH and we don't see the same problems,' says Dev Tyagi, a spokesperson for Boston Technologies.

Australia's most popular printer for home and small offices combines exceptional value, with outstanding performance.

Use 75% less ink. Super Economy mode reduces ink consumption by 75% compared to Standard mode, and works for both black and white and colour. Combined with an optional high capacity, black ink cartridge, it can print up to 2400 pages in black and white, and up to 400 in colour using standard inks*. That's anywhere from two to five times the output of any direct competitor!

Photo quality printing. There are three colour print modes – Normal, Fine and Photo. Photo mode emphasises highlights and contrasts, and improves half-tones by producing richer blacks. Or, using the optional black ink cartridge, you can convert the BJC™-265SP to a fast B&W printer.



Brilliant colour, super economy, optional PhotoRealism, better Internet printing,

all for just \$149.

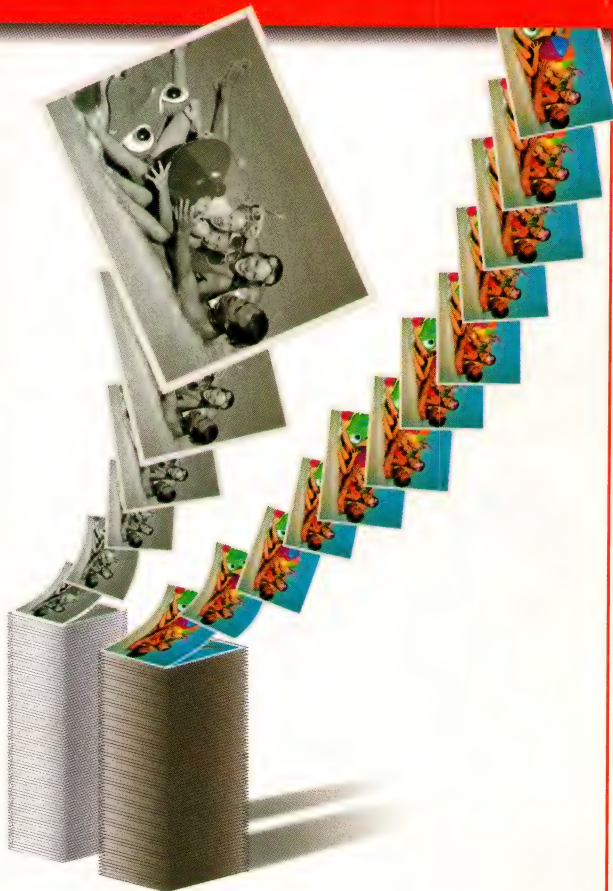
Optional PhotoRealism™ To this Canon adds the option of PhotoRealism inks, for photographic reproduction approaching silver halide quality. It produces up to four times the colour combinations of conventional CMY printers, for smoother colour gradations and more accurate colours in skin tones and other light shades.

Better Internet images. Image Optimisation takes low resolution Internet images (typically 72 dpi), and prints them at the highest resolution supported by the printer to reduce jagged edges and pixelisation.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers

are available for Windows® 3.1x/95/98 and Windows NT. The BJC-265SP offers exceptional operating economy plus high quality colour printing, for just \$149.

For more information call 1 800 021 167.



BJC-265SP colour Bubble Jet™ printer – \$149^{RRP}

Canon

* Based on 5% page coverage for B&W and 7.5% coverage for colour, Super Economy not available with PhotoRealism inks. Price shown is the recommended retail price including tax. Canon and the Canon logo are registered trademarks and BJC, Bubble Jet and PhotoRealism are trademarks of Canon Inc. Windows is a trademark of Microsoft Corp. in the U.S. and other countries. Canon Australia Pty Ltd, ACN 005 002 951. CS8409

Gigahertz Willamette

Intel has unveiled details of its 32-bit roadmap, showing off its first 1.5GHz chip at the Intel developer forum in Palm Springs, writes Benny Har-Even.

Codenamed Willamette, the chip will be based on a different core to the Pentium III, leading many to speculate that it will be launched as the Pentium IV. The chip will also be the first to include features such as SIMD Extensions 2 and Hyper Pipeline technology, as well as being the first to include a 400MHz bus. 'It's a brand-new architecture that enables really the very, very highest clock speed,' says Albert Yu, Senior Vice President and General Manager for Intel's Microprocessor Group.

SIMD Extensions 2 technology is the latest iteration of Intel's existing

SIMD technology, and will provide a significant boost in performance. This is because, whereas SIMD allows the chip to grab 128-bits of data in floating point and 64-bits in integer at a time, SIMD 2 Extensions allows a chip to grab 128-bits of data in both. 'We added the floating-point single precision four by 32, which basically [means] you can grab 128-bits,' says Yu.

Intel also has high hopes for the Hyper Pipeline technology, claiming that it's the key to upping processor clock speeds. 'It [Hyper Pipeline technology] enables a higher frequency. We have 20 pipeline stages versus the ten for the P6 architecture,' he claims. Also central to the chip's performance is the inclusion of two ALU (Arithmetical



Intel's Albert Yu unveils its next-generation Pentium chip.

Logic Units), each running at 3GHz in the 1.5GHz chip on show.

Intel is hoping to launch the chip in Q3 of this year, reaching volume production by the end of 2000. 'My anticipation is that we will be shipping hundreds of thousands of Willamette

processors by the end of this year. We're going to be shipping millions of units next year, and we're going to drive this product into the performance mainstream of the desktop marketplace,' says Yu.

Hacking hassles

Australian companies and organisations are under threat from a flood of potential hacker attacks. The Australian Computer Emergency Response Team says there were about 2,000 computer security incidents reported in the first three months of this year, compared to a total of 1,800 for all of last year. The incidents ranged from systems being scanned to actual denial of service attacks designed to shut down entire networks.

criminal activity should be reported. However, AusCERT's credibility with its members would be severely affected if it went against their wishes and this creates a no-win situation.

Despite the problems presented by confidentiality the organisation works to maintain a good relationship with law enforcement authorities and often acts as a conduit for information from people and organisations that do not want to be identified.

MacMillan said AusCERT faces

some strange problems when it comes to giving evidence in court, especially if it has reverse

engineered hacking tools to find a way to combat them.

Technically, under existing Australian law hackers maintain copyright over

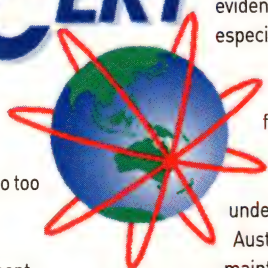
any software tools they develop and any evidence gained by reverse engineering the tools could be considered to be illegally obtained and therefore not admissible.

While no hacker had yet claimed copyright on any hacking tools, some have egos big enough to do it and so the problem will have to be dealt with, said MacMillan.

AUSCERT

AusCERT co-founder Rob McMillan warned that technology is about to make some major advances, but so too are hackers. He said that, contrary to popular belief, AusCERT is not an enforcement agency and is often faced with being unable to report incidents to the police because member organisations that have been attacked wanted the situation kept confidential.

The situation presents a problem for AusCERT staff who are members of organisations that have a code of ethics stating that all cases of known



Comdex Asia 2000

Flat screens, small profile PCs, Web tablets and new ways to get the best out of e-commerce dominated the recent Comdex Asia 2000 trade show. While the event provided lean pickings in terms of new announcements it did provide a glimpse of where things are headed in the near future.

What was particularly clear is that the big, beige and boring PC would soon be a thing of the past.

By the end of the year PCs will be small, stylish and speedy with LCD-TFT monitors and unobtrusive slim-line 'boxes' or with everything integrated into the monitor. You will need less than half the space currently used by your PC and in some cases less than a quarter. While the much vaunted Bluetooth wireless system was noticeable by its absence, it was obvious manufacturers plan to reduce wired connectivity to a minimum with cordless keyboards and mice.

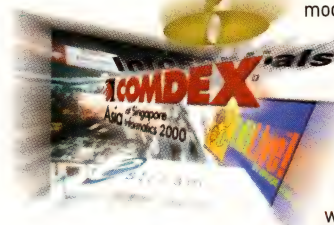
A strong theme of the show, like so many others these days, was e-commerce in the new millennium and there was plenty to give most businesses something to think about.

Internet call centres that offer 24/7 help lines over the World Wide Web instead of the telephone; foldable Web tablets that wirelessly connect to the Internet at speeds up to 10-times faster than a cable modem and voice

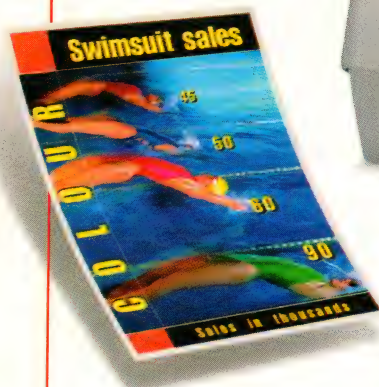
activated WAP applications that will tell you what the weather conditions are anywhere in the world, all drew crowds.

The first locally available, reasonably priced videophones were on show but received only moderate interest, possibly because, while they look nice, they are still jerky and far from perfect.

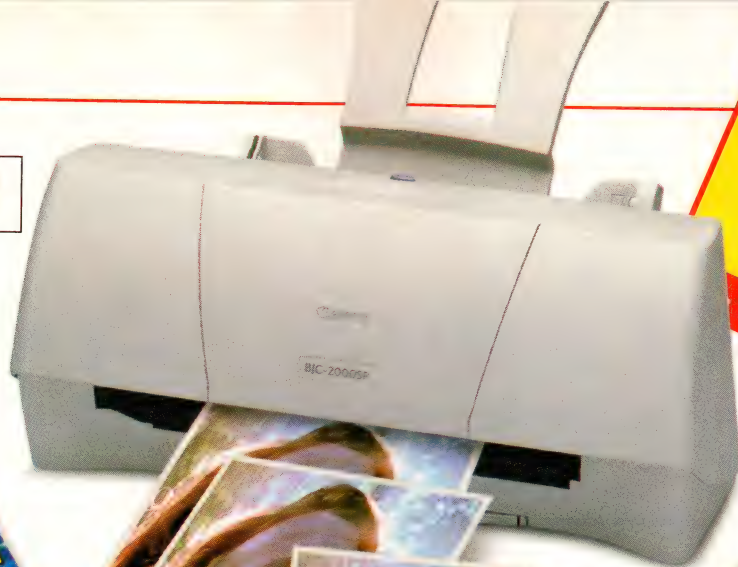
The Australian contingent at the show proved that we are at the forefront of some of the key trends. Melbourne-based Infosentials did a roaring trade with its eStream technology, designed to provide on-the-spot audio/visual step-by-step answers to online queries, while Brisbane's Ephox recorded more visitors than any other stand in the show as the company demonstrated its EditLive! browser plug in that allows complete novices to edit Web sites.



Super Economy in
colour and B&W



PhotoRealism and Drop
Modulation Technology



\$199

Value, Value, Value.
STOP PRESS · STOP PRESS · STO



Super fast blacks

Whether you judge it on features, performance or price, the new BJC-2000SP is
amazing value for money.

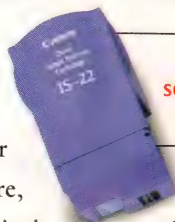
The new BJC™-2000SP proves that beauty can be more than skin deep.

Because it was also designed to deliver high-speed blacks, superb photographic printing, superior operating economy and even offers optional scan/copy/fax functions – all for an incredibly low price. And that's just for starters!

Introducing Automatic Image Improvement.

Canon has developed a way to automatically improve less than perfect digital images, without needing colour balancing and re-touching. It's called Photo Optimiser. This new, selectable driver function automatically adjusts for defects in exposure, highlights and shadows, without affecting the original file in the computer.

Brilliant colour. To further improve images, Drop Modulation Technology™ with dual drop sizes for smoother colour gradations works on all paper types. Then, for the gold standard in photographic reproduction, Canon's PhotoRealism inks¹ vary the saturation per pixel so that a single dot could have 0%, 33%, 67% or 100% of a colour.



Optional IS-22
scan head fits into
print head slot.

This produces up to five times as many colour combinations as conventional CMYK inks, with better half-tones and almost no visible grain, even in areas of low colour density.

Better operating economy. Super Economy mode reduces ink consumption by up to 75%, and works in both black and white and colour. It can print up to 3600 pages in black text, and up to 400 in colour.² And because the standard inks are optimised for low-cost plain paper, you can keep the cost of your everyday printing needs to a minimum.

It's even a scanner. The optional IS-22 scan head allows you to turn your printer into a colour scanner in seconds. It scans colour images up to 360 dpi and documents for fax, OCR and copying functions with the appropriate software.

Canon Customer Care. Canon Australia supports the BJC-2000SP with a one-year warranty, upgradeable to three years for minimal cost, and is backed by Customer Care hot-line support. For more information call us on 1 800 021 167.



New BJC-2000SP colour Bubble Jet™ printer – \$199^{RRP}

Canon

Price shown is recommended retail price including tax. Canon and the Canon logo are registered trademarks, and BJC, Drop Modulation Technology and PhotoRealism are trademarks of Canon Inc. All other trademarks are the property of their respective owners. 1. BC-20 Black and BC-22E PhotoRealism ink cartridges are optional. 2. B&W output for BC-20 ink cartridge at 5% coverage and colour output for BC-21e measured at 7.5% coverage. Canon Australia Pty Ltd ACN 005 002 951. CS/8411



HorizonsInternet

The Internet is an ever-changing place, but we bring you the latest trends and reviews of the latest sites to keep you up to date online.



IN BRIEF

Cab on call

Anyone who's tried to book a cab on a busy Saturday night has probably experienced the frustration of endless elevator music and repeated messages about the importance of their call while waiting to speak to an operator. This experience could well be a thing of the past for travellers in Adelaide, where one local taxi operator has just installed an Internet reservation system. Bookings made via Adelaide Independent Taxis' Web site as transferred directly to the company's dispatch system and onto the screen of the nearest cab.

Privacy issues

Using a work address to send personal emails only to later discover that your messages can and have been read by the network administrator and other company officials can be disconcerting or downright embarrassing for many people. The latest player to weigh into the argument is the federal government. In April, the federal Privacy Commissioner launched guidelines for email monitoring in the workplace, which advised organisations against systematic and ongoing surveillance of messages. Whether companies take the advice to heart remains to be seen.

Dot.com queen

The rise and rise of the Internet has seen dozens of fast fortunes made on the back of catchy dot.com concepts. From Silicon Valley to South Sydney, investors have gone into collective excitement overload at the mere mention of new stock market listings prefaced by the letter 'e' in recent years. While Internet millionaires - and billionaires - are popularly perceived as pony-tailed 20-something IT whiz-kids, Internet

investment frenzy has taken hold in all strata of society. Earlier this year, it succeeded in permeating one of the last bastions of old world tradition in the western world - Buckingham Palace, the official home of the English royal family.

In April, Queen Elizabeth II, already one of the country's richest women, expanded her fortune still further, thanks to a canny investment in Getmapping.com. The newly listed

British Internet start-up is producing an aerial photographic map of the whole of the United Kingdom, for sale via the Internet. Business has been brisk to date, with local governments and real estate agents quick to snap up selected sections of the country for use in their business. When the company floated on London's Alternative Investment Market, the value of Her Majesty's investment soared to the royal sum of £870,000.

Dot.com economy

Open a newspaper any day of the week and there's a fair chance there'll be at least one story either on the latest Internet start-up set to rake in millions, or how an established organisation plans to turn itself into an online enterprise. Couple this with all the publicity given to early online shopping services such as Internet bookstore Amazon.com and record retailer CDNow, and you could be forgiven for thinking that conventional 'bricks and mortar' businesses are dead in the water. But according to IT

analyst firm Gartner Group, the future is not quite as rosy as all that for the plethora of online enterprises to hit the market in recent times.

At a Gartner Group symposium in America in April, Chief Executive Michael Fleisher predicted tough times ahead for the dot.com sector. So tough, in fact, that up to 98 per cent of existing dot.coms were likely to fail in the next two years, according to Mr Fleisher. He told delegates that traditional businesses which did not take steps to incorporate the Internet

into their operations would also struggle. Gartner's success tips for dot.coms include not planning more than two years ahead and revising business plans at least every three months. 'Speed and ruthless execution is everything', the firm advises would-be online stars. Existing businesses are advised to develop separate strategies for individual business units and geographic areas, rather than implementing company-wide strategies.

Taxing the net

For many consumers, the advent of Internet shopping has represented the throwing open of a massive global market place. Goods and services of all descriptions from around the world can be sourced and compared, regardless of whether the seller is based in Sydney or San Francisco. For governments though, the rising popularity of Internet shopping represents something of a threat to their long-established revenue bases. While levying sales tax on products bought close to home is simple enough, collecting taxes and import

duty on individual items from overseas or interstate via the net represents a trickier proposition.

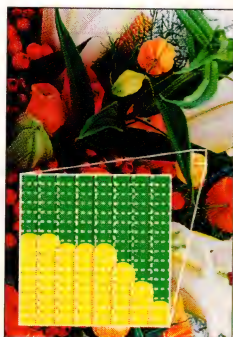
This issue has made its way onto the agenda in the United States senate, as politicians there debate whether to extend for a further five years a moratorium on e-taxes, which is set to expire next year. The issue of whether and how taxes should be levied on net purchases in the US is further complicated by the fact that each of the 52 states has its own sales tax regime. Currently, sellers do not have to collect taxes if they are

located in a different state from a buyer - a loophole which allows both buyers and sellers to side-step sales tax in most cases. Supporters of an extended moratorium claim that levying taxes on Internet purchases would destroy the online economy, while opponents counter that the current situation provides net retailers with an unfair advantage over their bricks and mortar counterparts. Others argue that state sales taxes should be replaced by a federal sales tax of five per cent for all Internet purchases. Watch this space.

Hard to imagine 1440dpi @ \$299.

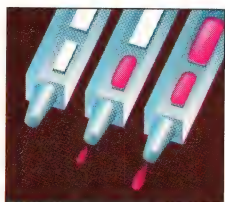
Imagine this. Extraordinary quality, superb blacks, great speed, automatic image improvement, parallel and USB ports, optional PhotoRealism and scanner cartridges. It's the new BJC-3000.

1440 dpi, with variable drop sizes. The inks are optimised for plain paper, print in resolution up to 1440 dpi, and use Drop Modulation Technology™ with variable ink drop sizes for smoother colour gradations and finer lines.



Resolution up to
1440 x 720 dpi.

Variable ink
drop sizes
improve
definition.



You get brilliant colour with high speed bi-directional printing up to 9 ppm in black & white and up to 4 ppm in colour, text and graphics!

The PhotoRealism advantage.

An optional PhotoRealism cartridge uses specially formulated low-density inks for more colour combinations per dot than conventional CMYK ink. The result is stunning photographic reproduction with smoother colour gradations and reduced grain.

Automatic Image Improvement.

There are two selectable, automatic functions to improve digital images. Photo Optimiser adjusts photographs for defects in exposure, highlights

and shadows. Image Optimiser can "correct" low-resolution Internet images up to the printer's maximum resolution.

**TRANSPARENT,
SEPARATELY
REPLACEABLE
INK TANKS.**

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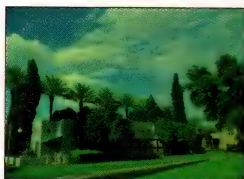
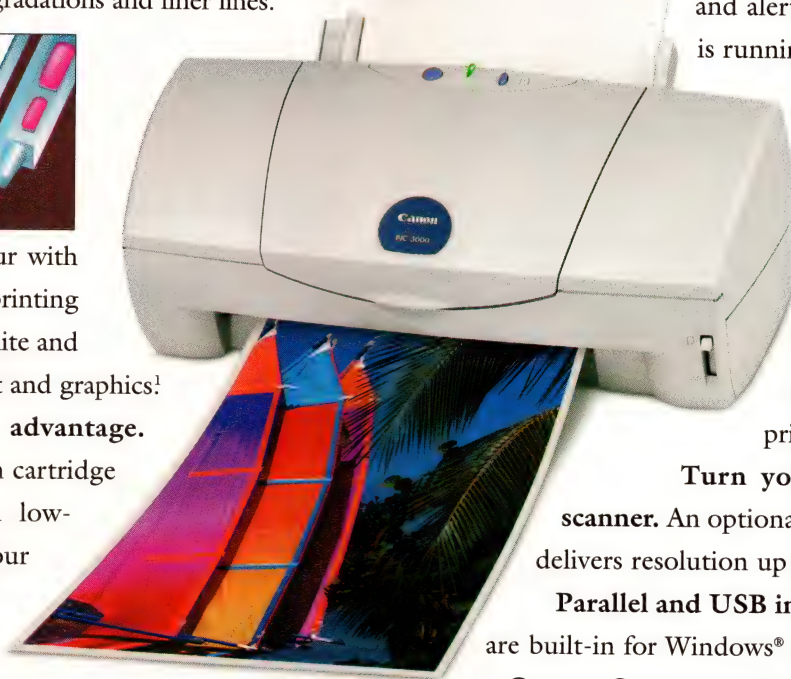
Superb operating economy. The ink detection system monitors ink levels and alerts users when a tank is running low. All ink tanks can be replaced separately from the print heads. This reduces operating costs, while helping to prevent running out of ink during a print job.

Turn your printer into a scanner. An optional scanning cartridge delivers resolution up to 720 dpi.

Parallel and USB interface. Both ports are built-in for Windows® and Macintosh?

Canon Customer Care. The BJC-3000 features a one-year warranty upgradeable to three years for a minimal charge, and is backed by Customer Care info-line support.

For more information call us on 1800 021 167.



Automatic image improvement refines both
photographic and Internet images.



**New BJC™-3000 Colour BubbleJet™
printer – \$299^{RRP}**

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Peakhour

E-business. For the last 18 months, every human throughout every industry has been heralding it as the wave of the future. Get on the bus or stay off, because the so called digital revolution is changing how we shop and how we sell. For a minium price, Peakhour is going to tell you how to get in on this wave and design Web sites for maximum monetary efficiency. It is also a service provider for all things Internet related.

The usual Host ministrations are here: email, site hosting, and business email but then the company goes one step further, by designing sites for a very reasonable sum, finding and registering domain

names, and the absolutely vital service of ensuring that your online credit purchases are utterly secure. Peakhour provides online and specialist support in all areas of e-business, and has reseller and affiliate programs so you and the company can share the wealth and bring in new clientele. The site itself also comes with a very reasonable, though brief, glossary of terms concerning the Internet. Peakhour are a site that anyone thinking of setting up shop on the net should consult, small and medium businesses both.

www.peakhour.com

Moneyshop

The Moneyshop bills itself as Australia's first online supermarket of financial advice. It has designed a Web site around the idea of grocery store and shopping cart commerce, and they may very well be right in making such a grandiose claim. This novel approach to Web site design has worked exceedingly well, making the site eye catching, interesting and most of all, completely navigable. Moneyshop offers advice on all areas of finance, including banking, insurance, super, shares and GST and much more, all

in layman's terms. Its news service, consisting of message boards, articles, and advice is particularly worthwhile, showing how others have succeeded or failed; sensible links are given to support this information. There are also financial planning services and even a kids club for young capitalists. If the Moneyshop has a fault, it's that it is perhaps a little informal, and is only a starting place for people who need hard information, not a place to store all your financial futures.

www.themoneyshop.com.au

Bottleshop

For anyone who ever fancied a tippie, Bottleshop is here to make your drinking so much easier. Filled with all the usual items you should find at any normal alcohol vendor, such as wine, beer, fortified wine, spirits, mixers, and various paraphernalia, accessories and even party packs, the site will let you register and purchase online, while also having an exceptional delivery service, including a large range of next day deliveries. Considering the amount of regional areas that this service covers, this is no small feat. Unfortunately, shipping costs are a tad prohibitive to some of these

regions. The built in search engine, important for such shopping, is simple and is quite effective. The members section lets you access specialty merchandise and tells you about specials and sales.

Bottleshop is a streamlined and elegant online shopping site; it wastes no time, has no need for overly flashy presentation and gets you what you want, how you want it. Online shopping sites could do much worse than be modelled after this one.

www.bottleshop.com.au



THINK TANKS
for greater economy.
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1440 DPI, Drop Modulation Technology and Individual Ink Tanks.

If you demand speed, quality and economy from your printer, look no further than the new Canon BJC™-6000.

New see-through ink tanks. What really distinguishes the BJC-6000 is the new ink tank system. For better operating economy there are individual see-through ink tanks for all colours. Each is separate from the print heads, significantly reducing operating costs and allowing you to replace only the empty tank.

The think tank system. Each ink tank has a prism moulded into the bottom. A beam of light measures ink status, and a monitor in the printer driver keeps users up to date on the amount of ink remaining in each cartridge.

More life-like colour. An all-new driver emphasises colours as they are perceived by the human eye. The result is natural colours with more subtle variations in dark shaded regions, and better gradations in highlighted areas. PhotoRealism with a six-colour ink system and Drop Modulation further enhance quality, even on plain paper.

1440 X 720 dpi. Drop Modulation Technology™ generates droplets around one-third the size of

conventional droplets giving you high resolution printing at 1440 X 720 dpi. The result is a sharper image with smoother tonal gradations.

Sharper Black Text. Drop Modulation Technology is now available for the first time with a black cartridge to help eliminate grain in text. At the same time newly developed black ink gives sharper, clearer text with improved water resistance.



New, high-performance engine. An innovative new engine design provides the fastest print speeds, in both black & white and colour, of any Canon Bubble Jet printer.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost,

and are backed by Customer Care hot-line support. Drivers are available for Windows® 95/98/NT and an optional USB conversion kit is available with drivers for Windows 98, iMac and Mac G3.



If you are looking for performance and economy, you've found it in the new BJC-6000. For more information please call us on 1 800 021 167.



New BJC-6000 – \$399^{RRP}

Canon



Fair use in IT

Online privacy in the workplace, monopoly in the boardroom, and David Hollingworth goes on a holiday. What do they all have in common?

Newslog

**'why can't
someone
paying money
for their own
connection
'lend' that
access to
someone
else?'**

This month three things caught my attention out of all the many and varied goings on of the wired world. Tech stocks finally took their big plunge, and while that really was *the* thing for many this month, it really didn't grab me. For me it was three apparently unrelated, and quite possibly un-newsworthy, events. Microsoft's guilt in the landmark anti-trust case, Telstra's laying off of a couple of dozen employees for watching porn on company time, and my ability to go on holidays without leaving the virtual office (now you see what I mean by un-newsworthy).

Strange as it may seem, I see a real thread running between the Washington court, the offices of Australia's largest telco, and my own work habits. It all comes down to proper, or, more correctly, the improper use of technology.

Yes Microsoft is big-business at its arguably worst; but what would you do in its shoes? Your boss is one of the few people to truly miss the Internet boat, and suddenly there is a whole raft of companies making money off this thing that he thought was a fleeting success. What you do have is the number one OS in the world - sorry Linus, but let's face facts here - so when Big Bill gets his head screwed on straight you leverage the market penetration of one product to sell another. Sure, Microsoft went too far in its strongarm tactics, forcing ISPs and other Internet companies to use IE over Netscape, but the essential marketing strategy was sound. In fact, many other companies use similar tactics every day and get away with it - selling one thing because another is packaged with it.

Online privacy in the workplace is becoming the latest mini-controversy in the Internet arena, and Telstra is the latest company to have its policies attacked and ridiculed. In late April the telco laid off 27 workers for obtaining pornography on Telstra's own Internet connection. Many further workers were cautioned, some for such massive abuses of privilege as having pictures of their family on work PCs or for having had a particular file emailed to them - something that they actually have no control over.


Lastly, the odious case of my very own Internet shame. While spending time away from the office in Melbourne I was able to use another person's Internet account to access my work email, often logging on from a number of different machines and locations. Apart from my remarkably zealous attitude to getting the job done, this may seem pretty innocuous; not so when you consider that it is actually illegal, as stated by the ISP in question, for another person to use your account at another machine. On a number

occasions I have been logged in to a friend's account from one location, when they have tried to log onto it from their own machine. What happens is I get bumped off-line, which is only fair, but then I and the 'correct' user get a nasty email stating that by letting someone else access the account we are both in violation of the account agreement, and told to not do it again.

All of these things are technically wrong. Whether by law of the land or by the conditions of employment of a particular workplace, or the contractual obligations of a given service, they are wrong. On the other hand, are they really that bad in practice?

Let's look at some similar, yet non-tech related issues. Take your desk at work, for instance; most people clutter their workspaces with family photos, pics of their partners or favourite action figures - I've got Angel from *Buffy the Vampire Slayer* sitting next to my keyboard - yet I can't think of any company that would find fault with personalising desk-space to this degree. Sure, most people don't pin up naked ladies around the office, but if the nudity is on your hard drive, than no one is easily offended by it. As for company time, anyone who is reasonably familiar with surfing and email knows how easy to it is to multi-task such activities; if you're sitting there waiting for a particular page to download then having a second window open is not going to slow down your worktime.

For another read on the borrowed Internet account, think of how easy it is to pass around a newspaper, which is a reasonable analogy to buying Internet time. You can lend the paper to whomever you wish without violating any kind of contract with the publisher, so why can't someone paying money for their own connection 'lend' that access to someone else? It happens a lot anyway through people accessing the net through somebody else's PC, but for some reason it ceases to be okay if you take that connection elsewhere.

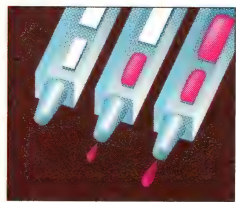
I haven't been able to think of a similar case to Microsoft's market dominance, but then again that's one of the reasons that the case went to court in the first place. The final decision in the case - after the appeals process - is going to shape how tech companies grow and market their products profoundly, and it's a law that certainly needs to be decided quickly as Microsoft is continuing to pump out product. However the decision over what is 'fair use' of technology needs to go a lot further, and to be looked at rather more holistically. 

David Hollingworth

From work at home to artwork and publishing to CAD, big jobs are
now easier than ever.

Whether you're an experienced or first-time user, Canon's new BJC-6500 makes it easier than ever to get professional print quality in sizes up to A3.

1440 dpi, variable drop sizes. Extra-rich black and colour ink cartridges are included in the box. The inks are optimised for plain paper, print in resolution up to 1440 dpi, and use Drop Modulation Technology™ with variable ink drop sizes for smoother colour gradations and finer lines.



Variable ink drop sizes improve definition.

Fast throughput. The dual cartridge system also employs bi-directional printing for speeds up to 9 pages per minute in black & white and up to 6 ppm in colour, text and graphics!

Optional PhotoRealism. The process utilises a 6-colour high/low density ink system for far more colour combinations for photographic printing.



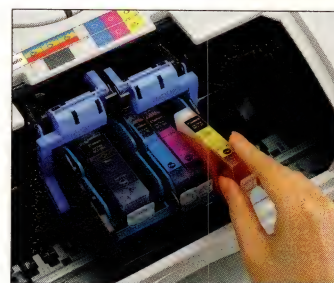
New BJC™-6500 Colour BubbleJet™ printer – \$749^{RRP}



A3+1440 dpi
 Windows and Mac.
 ESS · STOP PRESS · STOP PRESS · STO

The result is better tonal definition and reduced grain, even in off-whites and skin tones.

Superb operating economy. The ink detection system monitors ink levels and alerts users when a tank is running low. All ink tanks can be replaced separately to help maximise operating economy.

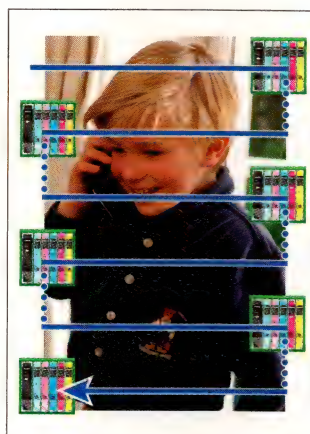


Exceptional operating economy, replaceable ink tanks.

Turn your printer into a scanner. An optional scanning cartridge delivers resolution up to 720 dpi.

Parallel and USB interface. Both interface ports are built-in for Windows® and Macintosh?

Canon Customer Care. The BJC-6500 features a one-year warranty upgradeable to three years for a minimal charge, and is backed by Customer Care info-line support. Call us on 1800 021 167 for more information.



High-speed bi-directional printing.

Canon



Hacked off

Is the recent spate of hacker attacks on e-commerce sites motivated primarily by a need for recognition?

Idealog

Watching journalists on the dailies trying to figure out the motivation of the hackers who brought down Yahoo! and other big sites in early February has been a source of some amusement to me this week. Theories I've seen put forward include sheer nihilism, quasi-religious hatred of Bill Gates, envy against the new net millionaires, a snobbish desire to exclude net newbies, or a trial run for future blackmail attempts. Now I don't know these hackers personally, and I'm sure that they have a mixture of motives, but if asked my opinion I'd have said that there is one overridingly powerful motive behind their hacking - self-esteem.

I can almost see you recoiling in horror. Oh my God, he's into psycho-babble! He's joined the touchy-feely brigade! Not so. Please bear with me a little further. I realise the term self-esteem has acquired rather horrible connotations nowadays, conjuring up images either of an earnest social worker counselling a 13-year-old ram-raider, or a narcissistic Californian gazing in the mirror while drooling, 'I'm going to be the best me I can be today'. But that isn't what I'm talking about here. My conception of self-esteem means earning the esteem of others, while knowing that you've earned it. Self-esteem of that sort can only come from some kind of successfully shared enterprise, and in the case of the hackers that enterprise is outwitting the site owners, the National Security Agency, the FBI, in fact everyone in authority. These are people proving to the world that they are smart, and helping each other to do so. It's not the mentality of the lone terrorist who just wants to smash things, nor of the bank robber. If these guys wanted money badly enough they'd set up Web sites rather than hacking them. After all, if the press is to be believed, anyone who's out of nappies can start a million-dollar Web company nowadays.

This quest for esteem is also what drives the freeware phenomenon, where people band together to do something useful and clever, their only reward being the esteem of their colleagues (and before you write in, no I am not suggesting that Linus Torvalds is the Fu Manchu behind the hackers). The fact that I've sometimes been scathing about Linux in this column - because it is fundamentally outdated technology - doesn't mean that I can't appreciate the sentiment that produced it. I know something of this hacker mentality because back in the late 1980s, colleagues on the now defunct Byte magazine were involved in the Stone Soup group, which wrote the freeware Fractint program that wasted everyone's CPU cycles drawing

the Mandelbrot Set. The copyright notice distributed with Fractint included the sentence, 'don't send your money, got money, want your admiration,' which could hardly be more explicit.

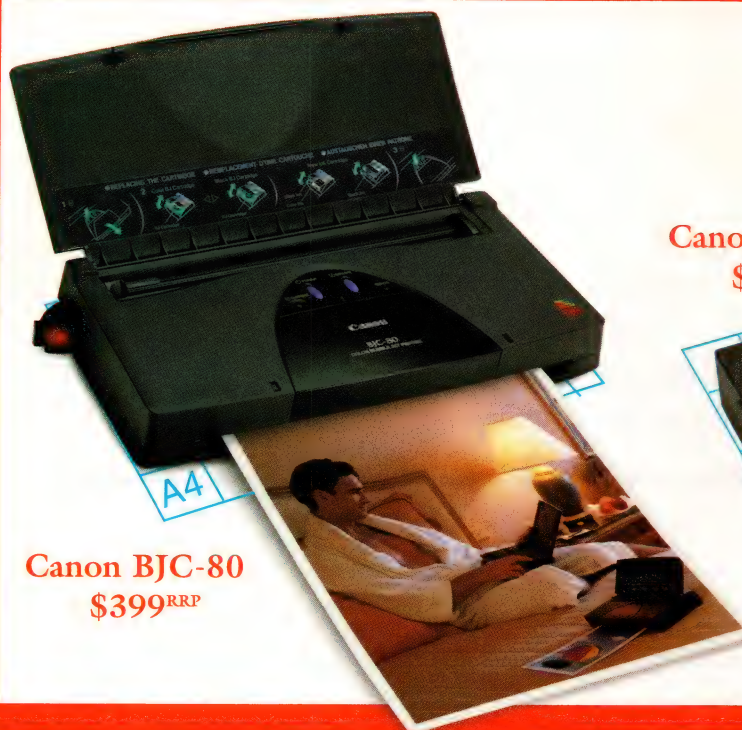
A fortunate minority of people used to gain the sort of self-esteem I'm talking about from their job and from family life, but that appears to be less and less possible. The modern cult of celebrity means that a handful of Poshes & Becks, Camerons and Leonardos garner all the available admiration unto themselves, but unfortunately this fails to fulfil the second part of my criterion. Merely having the esteem of millions bestowed upon you doesn't work unless you believe you've earned it - so it often ends in anorexia, addiction and the Betty Ford Clinic. Meanwhile, their flaunted celebrity lifestyles make the rest of us feel inadequate, and rob us of much of our self-esteem.

Those idealists who reformed our educational system hoped that universal secondary education would eventually enable everyone to gain mentally stimulating employment, but to say this goal has been missed would be an understatement on a par with calling the Titanic's safety record 'rather disappointing'. The media has made all of us aware of what a creative job looks like, but only a tiny handful can actually get paid to do one. Contrary to popular myth, Sigmund Freud never believed that the only thing that matters in life is sex: he was quite clear that mental health is best preserved by two conditions, fulfilling work and love, but in the 1960s this prescription got truncated to 'All You Need Is Love,' and we're now living the consequences.

What the hackers and the freeware people know is that the Internet has the potential to make creative work available, if not yet to all, to far more people than now have it, and they have just set about doing it for themselves. However, they also see this potential in danger of being snuffed out, swamped by a torrent of e-commerce, e-consumerism and e-greed. I find it difficult not to share a certain queasy nausea at the non-stop stream of TV ads for dodgy new .com services and the unwholesome worship of net millionaires in the popular press. The PC business itself followed a very similar trajectory - an early frontier-style free-for-all where anyone could pitch in and contribute was slowly wrestled under control, bought up and smothered by big corporate money. But I think I'd better nip this in the bud right now because I'm too old and wise to go around sounding like a hacker... 8

Dick Pountain

**'If these guys
wanted money
badly enough
they'd set up
Web sites
rather than
hacking them'**



Canon BJC-80
\$399^{RRP}

Canon BJC-50
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PORTABLE
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Advanced colour, cable-less communications, optional scanner plus two sizes that are

Small and smaller!

Canon has a wonderfully new idea for people that need a portable printer. A choice.

On the small side there is the BJCTM-80. It is a fraction of the size of a briefcase. Yet, with its in-built sheet feeder and power adaptor included as standard, it is designed for people who have to produce high volume output from a very small printer.

Drop Modulation Technology.

Conversely, if size is critical, there is the brand new BJC-50 with in-built battery. It's not just small, at approximately half the size of the BJC-80 it's absolutely tiny.

Equally impressive, their performance is as big as their size is small.

Using Canon's advanced Drop Modulation TechnologyTM you can print everything from colour charts, to high quality photographs. Or, in seconds you can convert to extra high-speed black and white for finished business documents using the dedicated black cartridge with 128 print nozzles!

For greater portability, both models include an infra-red port for totally cable-less communications with any suitably equipped Windows[®] 95/98 notebook or PC.

And, if you really need the functionality of an office in the space of a briefcase, both models will accept an optional colour scanner head in place of the print head. It takes only seconds to change the heads. You can then use the scanner head to acquire colour images, or for fax and OCR functions.*

Cable-less communication.

Canon Customer Care. All Canon printers feature a one-year warranty, upgradeable to three years for minimal cost, and are backed by Customer Care hot-line support. Drivers are available for DOS, Windows 3.1x/95/98 and Windows NT.

If you need help choosing between small, and smaller, give us a call on 1 800 021 167.



The BJC-80 fits in approximately half the space of a briefcase. The BJ-50 is approaching 50% smaller still.

Optional colour scanner.

Canon portable colour Bubble JetTM printers

Canon



Tiger attack

Both Intel and AMD could be under threat from a new processor from the Far East that's hot on security and has encryption decoding ability.

Technolog

Just when you thought the CPU wars couldn't get any more interesting, a new company looks set to turn the old Wintel order on its head yet again. The Malaysia Processor Company (MPC) plans to launch its first 1.5GHz processor, codenamed Pentajaya, in the middle of 2000. The CPU is expected to be released with the brand name Gigachip, although no formal announcement has been made. An x86-compatible processor with a 64-bit core Gigachip could give performance levels an order of magnitude again over the 1GHz parts from Intel and AMD.

Industry pundits claim that the threat of AMD's 1GHz Athlon and the MPC Gigachip has led to Intel's early release of the 1GHz Pentium III through big-name vendors such as HP. Early benchmark results, admittedly emanating from MPC's own marketing department, show a 1.5GHz Gigachip's performance being 40 per cent faster than the published application-based benchmarks for the Athlon 1GHz. Even though the Gigachip requires a brand-new motherboard with a VIA GC133TR chipset, it uses a Socket 370 form factor, which should keep costs down. The Gigachip itself sports 256Kb of on-die full-speed cache on a 0.18-micron process, which should place its pricing at a similar level to Intel's latest Pentium IIIs. It all looks promising on paper. Gigachip has the potential to bring a new era in computing, where the West looks to the East for cutting-edge technology, rather than just for clever, cheap consumer gadgets.


This had to happen some time. Even after the Far Eastern recession, the 'tiger economies' have still got cheap, well-educated workforces, and some still have money in the bank, notably Taiwan, Singapore and Hong Kong. The latter supplied the venture capital for MPC, which is based in the tech-friendly Kuala Lumpur suburb called Cyberjaya, aka the Multimedia Super Corridor.

Malaysia's status as one of the largest chip-producing countries in the world, with fabs producing Pentium IIIs for Intel, for example, has made it an ideal location for a venture like MPC. The manufacturing skills and training were already there. All it took was an injection of external cash and governmental incentives for Western-educated microelectronics engineers to return home, and MPC was born. Malaysia's politically ambivalent stance towards the West, while still maintaining an essentially capitalist political system, has also given it the required courage to take on Western megacorporations like Intel. Gigachip marks a turning of the tide in Far Eastern CPU design, moving from low-cost parts for entry-level systems to premium, cutting-

edge processors. It's a proud statement of its intent to be technologically superior.

However, even if Gigachip lives up to the marketing hype and delivers on time with the kind of performance levels it's promising, there's still a lot to be done. After all, AMD has just about stolen Intel's crown as maker of the fastest processor around with the Athlon, at least until Itanium arrives *en masse*. However, business users still predominantly choose Intel. Even within Intel's own range, Celeron fails to interest corporate users, whose conservatism makes them choose the most mainstream, best-known processor platform. Athlon, despite its stunning performance, still mostly captures the hearts of home users. Gigachip will face the same struggle, and more so. MPC has to launch not only the Gigachip brand but also its own company name, which almost nobody has heard of, with only months until the first products are launched.

The media battle that lies ahead for MPC is not going to be a minor factor either. AMD already has a long history of challenging the CPU status quo, with varying success. MPC, an 18-month-old company, has no such track record. System integrators have been burned by flakey Intel clones in the past, most notably Nexgen, and its problems. They will take some convincing that Gigachip won't land them in a potentially bankrupting technical support nightmare. There's also the supply question. Can MPC keep up with demand, where even Intel has had difficulties getting enough processors delivered?

However, there's a potentially more sinister side to this whole story. Aside from a 64-bit core, Gigachip also sports a built-in 192-bit encryption co-processor, consisting of three 64-bit specialised floating unit pipelines. This has been included primarily to enhance e-commerce security, but will also give Gigachip the ability to crack weaker encryption more quickly than conventional processors. As a result, huge orders have already been placed by the Malaysian secret service and Mossad. The potential Gigachip holds for widening the gap between the technological haves and have-nots is worrying. Those who've bought into the new technology could enjoy a much greater level of e-privacy than those who haven't, as well as the potential to listen in on users of other platforms. Sources have claimed the recent spate of breaches at Amazon.com and Yahoo! could be linked to Gigachip. As this stunning technology emanates from the East, the West could find itself precariously entering the 21st century as a have-not. 

James Morris

**'The West
could find
itself
precariously
entering the
21st century
as a have-not'**



Canon's patented new LIDE technology helps these new scanners break the price/quality barrier.

Reinvent is the most over used word in the computer business. But this time it's true. Canon has just reinvented scanners.

And not a little bit, but completely.

Introducing LIDE.™ Using a new, patented technology called LIDE (LED Indirect Exposure), we have fundamentally changed the way scanners work, and their price/performance ratio.

LIDE eliminates the need for costly, complex optical mirrors in image acquisition, while it maintains superior image quality and colour clarity.

Easy to use. At the same time, LIDE allowed us to design a smaller, sleeker scanner with an exceptional combination of beginner and expert controls, and with easy to connect (daisy chain) parallel port connections for Windows® 95/98 and NT 4.0.

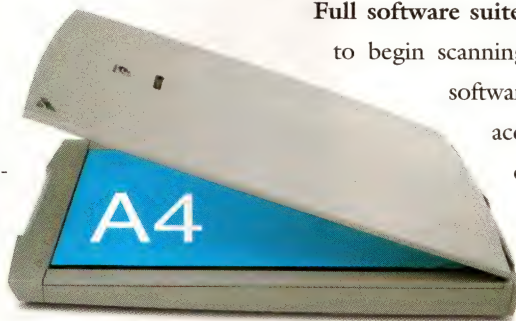
The new CanoScan™ FB 330P and FB 630P offer a choice

of 300 or 600 dpi optical resolution, plus enhanced resolution up to 2400 dpi* and 36-bit colour acquisition as standard.

Full software suite. Both come with everything needed to begin scanning immediately. The CanoCraft CS-P software works for both stand-alone image acquisition, and as a TWAIN driver for other applications. It features new, easier to use controls, and advanced controls for colour matching and image definition. Also included are PhotoExpress for image editing and OmniPage LE for OCR, a CD-ROM with full tutorial and user's manual, a parallel cable and power supply.

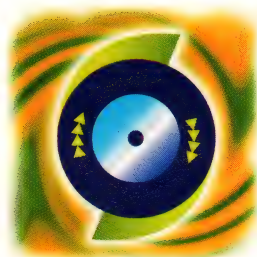
Canon Customer Care. The FB 330P/630P scanners feature a one-year warranty upgradeable to three years for minimal cost, and are backed by unlimited hot-line support.

The new CanoScan FB 330P and FB 630P. You can see they are different at first glance. To learn more call 1 800 021 167.



FB 330P – Now \$149^{RRP}
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Canon



Special upgrade offer

trueSpace 4

This is an exclusive offer to *PC Authority* readers only. The ultimate 3D animation product for only \$500 (\$US299).

Now that you've tasted the power of trueSpace 3/SE, how would you like even more power and more capabilities? We've teamed up with Caligari to provide a special offer just for *PC Authority* readers: trueSpace 4, the latest in its flagship line of trueSpace products, for just \$500 (\$US299) – a saving over \$500 on the original price.

TrueSpace 4 has all the new features introduced in trueSpace 3, plus new high-end features like Bones, NURBS, Function Curves & Scripting. A brand new hybrid radiosity renderer allows you to create the ultimate in realism. The renderer alone is as much as the full version of trueSpace 4, and Caligari is offering it to *PC Authority* readers for an incredibly low upgrade price.

If creating was a breeze with trueSpace 3/SE, the capabilities of trueSpace 4 will blow you away.

Upgrade now!
**You can have all this
power for only \$500***
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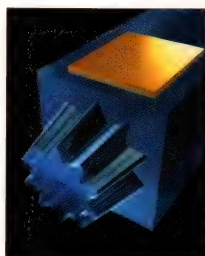
Remember, this is only available to *PC Authority* readers and only until the 17th of August 2000. Don't delay, order now!

1200 x 1200 dpi, 33 tonal levels and a 4 pico-litre droplet all contribute to Canon's new MicroFine Droplet Technology.

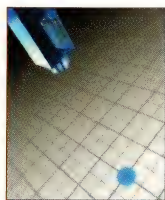
With the new BJC-8200 quality can no longer be defined by conventional measurements alone.

Smaller, better ink droplets. Quality starts with a process called MicroFine Droplet Technology.™

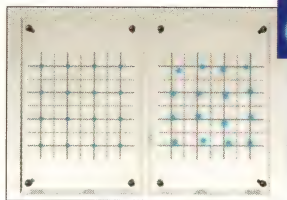
It produces 4 pico-litre ink drops. Each droplet is centre-weighted, creating a near perfectly round droplet, for far more accurate placement.



Special star shaped nozzles produce microscopic drops.



Accurate drop pattern.



grade paper.

1,536 ink nozzles. There are 256 print nozzles per colour for a total of 1,536 on the print head, to help maximise throughput and resolve the conflict between speed and quality.

1200x1200
4 picolitres
ESS · STOP PRESS · STOP PRESS · STO

SuperPhoto mode with 33 tonal levels.



1200 x 1200 dpi. This is necessary to produce a definition of 1,440,000 dots per square inch on any paper grade.

But, "effective resolution" goes even further, almost beyond the ability of the human eye to discern tonal gradations.

SuperPhoto mode, 33-tonal levels. This is possible thanks to ultra-low, one-sixth density, six-colour PhotoRealism inks capable of 33 colour gradations per dot.

This allows the SuperPhoto mode driver setting to deliver an unbelievable photographic reproduction on a special high



Turn your printer into a scanner. An optional scanning cartridge delivers resolution up to 600 dpi.

Parallel and USB. Both interface ports are built-in for Windows® and Macintosh!

Canon Customer Care. The BJC-8200 features a one-year warranty upgradeable to three years for a minimal charge, and is backed by Customer Care info-line support. For more information call us on 1800 021 167.



New BJC™-8200 Colour BubbleJet™ printer – \$749^{RRP}

Canon



Write on

Win a copy of Microsoft Encarta World Atlas worth \$100 if your letter is the pick of the post. If you have a good story, an amusing anecdote or a tale of woe we want to hear from you.

The beast awakes



I have a dream! To build a desktop monster - not particularly a gamer's machine, just an all-round beast - capable of blistering benchmark results with selected quality components and up to date specs, and still have change from \$4,000. I am also an avid reader of the *PC Authority* Labs, and it is due to these excellent reviews that I find myself rather perturbed.

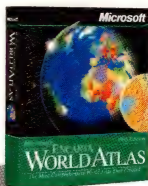
Through these reviews I have gained an appreciation of the 'art of computer building'. It seems to me that many of the systems reviewed, using quality motherboards and components, somehow fail in the totality of their design, leaving them with relatively poor benchmark results when considering their competition and their expense. Other manufacturers somehow seem to produce a machine to drool over with nearly identical components. This leads me to wonder whether it is at all possible for an amateur enthusiast, even a well-informed and knowledgeable one, to hit upon the right combination of

components that will lead to a fast, stable and well designed computer. Is my dream a pie in the sky? Should I just buy the latest Labs winner and forget about it? Can I really save a lot of money by doing it myself anyway?

G Powell

Simon Tsang replies:
That's weird, I have the same dream - and it's recurring. Generally speaking though, you don't save any money by doing it yourself. In fact, when all is added up, you'd probably save money by ordering your specification from a vendor, who can then assemble the complete system and supply a warranty for less than what you can get the individual parts for. Only die-hard enthusiasts who are absolutely particular about their systems dare venture onto the Swedish furniture path. Your dream is by no means a 'pie-in-the-sky' so long as you have plenty of patience, and don't mind spending a little more, while being only backed up by the component manufacturer's warranty.

Write in - If your letter is our Star Letter you could win a copy of *Encarta World Atlas* worth \$100! Please Note: all contributions to *PC Authority* will be considered for publication on these pages. Please keep submissions under 200 words.



Who likes Linux?

I've read [last] month's issue of *PC Authority* and I have to say that the article on Corel LINUX is a tad mis-informative (issue 30, p99). The article reads as though the system is a complete waste of space and time. This is what I hear a lot from people who spend five minutes with the OS and thus conclude it needs more work before it will be a another Windows system...

It ain't Windows and further more who would want it to be a lame Windows clone anyway. It's already bad enough that we have one frustrating and bug filled system; we don't need two of them.

Which brings me to my main complaint. If the reviewers had of spent a little more time in looking at the PPP dialer program they would have discovered how easy it is to connect to the Internet via an ISP of your choice. It's just as easy, if not easier, to setup a dialup networking connection to your ISP with Linux's dialler than it is with Windows.

Like Windows it needs to be told what to do. You can't just put in a phone number and a couple of DNS numbers and hope it works. I just wanted to say that you could have saved yourself a whole lot of frustration in regards to the dialup issue if only you had edited PPP's arguments and added the magic word NOAUTH when making your

ISP dialup account. Then you would have found no problems connecting to the net. Oh, and there's not a lot of internal fiddling and technical knowledge needed as you claimed in the article.

Far from it. Just one simple command and you're in. This information you could have found on any Linux user group or Web site regarding dialup networking. It's just a simple matter of taking the time to read what's required of setting up your system.

Hell I don't claim to be any Linux genius but I can tell you this much - I think without a doubt that this Linux distribution goes a lot further then any has before in terms of file sharing with Windows and ease of installation. As far as I'm concerned this system is well worth your 75 bucks spent for the standard edition box set. Especially when you consider the flawed and very expensive alternative. I know which one I'd buy.

M McClinton

Sam Varghese replies:

Firstly, allow me to reaffirm that Corel LINUX was in fact tested on four systems as mentioned in the review, and testing was done over the course of a week. The OS was installed about 16 times and tested for ease of use with regard to common features.



I couldn't agree with you more about your point on 'bug-filled' systems, but that doesn't mean you become an apologist for either OS. And remember that we have to evaluate a package both in terms of what it claims to be, and against its competitors, be they other Linux distributions or Windows.

I have set up PPP connections with Red Hat, Debian, SuSE, and Slackware so I am not exactly a novice. Neither is George Georgakis. It isn't easy to set up a dialup connection with Windows either.

Corel has provided a GUI dial-up utility and when it is told what to do, it doesn't do it. Remember that Corel was looked at out of the box. I did not attempt to get anything to run by going to the command line. And this has been specified in the review. We do not expect a new user to even know where the configuration files reside. Editing PPP arguments is easy when you know at least a little bit about Linux; the entire review was done from the point of how a new user would find it. And, can one really expect new users to know anything about Linux user groups or Web sites?

As to the installation, the word 'excellent' was used to describe it in the review. As far as file sharing with Windows goes, every Linux distribution can share files to varying degrees. The stumbling block to this has always been Windows, not Linux.

The voice of the New Millennium

When I wrote chiding *PC Authority* [Write On, issue 28] for perpetuating the 'new millennium rubbish' I did so with tongue loosely planted in my cheek and was very surprised with the lengthy editorial philosophical exposition that accompanied its publication.

On the same day that I read A Watt's supportive letter in issue 30, I heard an ABC announcer state that the oldest man in Britain had just died at age 110, and that he had lived in three centuries, a claim later repeated by Kerry O'Brien for one of the last two living Australian Gallipoli veterans, now aged 102.

The confusion that such ridiculous statements such as these can cause is sufficient reason for an 'Authority' to be very careful in its choice of words.

Some railway commuters may agree with Tim Dean that railway time is 'subjective and quite arbitrary' but if the compiler of railway timetables held the same view there would be chaos. I repeat my original argument. People who claim to speak with authority must ensure that what they say is true even if it is not popular.

The present century and millennium end on December 31 2000.

R Hookway

Getting in touch

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WEB <http://pcauthority.ajb.com.au>

Please limit Write On submissions to 200 words.
To get in touch with any of our Real World Computing contributors, please use the email address listed above.



please don't punish AMD. We should all be very happy for what AMD has done for the computer industry, especially in the last two years - CPU prices have dropped on average by 60 per cent.

RB

With you in a Shake

'The Cheetha X15 disk drive's performance is equivalent to a person reading the entire works of Shakespeare in less than .15 seconds.' It strikes me that what Seagate is getting at in it's latest press announcement is that many of the standard units for measuring computer performance (MIPS, Mb/s, Gigaflops, MHz, etc) are utterly incomprehensible to mere mortals, and it is necessary to use some measure that humans can get their minds around - no matter how absurd the actual analogy!

This is very similar to the practice of hydrologists in using the unit of the 'Syd'Arb' as a measure of the vast quantities of water in large dams. One Syd'Arb equals the volume of water in Sydney Harbour - three Syd'Arbs is somehow easier to grasp than so many hundred thousand megalitres (I'm afraid I don't know the actual conversion figure!).

So how about a new unit to measure data transfer rates. Forget the old measures of RPM, seek time, or Mb/sec. I propose that disk transfer rates henceforth shall be measured in 'Shakes', where one Shake is the data transfer rate to transfer the entire works of Shakespeare in 1 second. The Seagate Cheetha X15 thus scores the impressive figure of approximately 6.7 Shakes!

How about it?

J Hardy

Tim Dean replies:

As with your original letter, my first reply was also written with tongue planted squarely in cheek, although this time I will be less facetious and state quite simply that: you are absolutely correct. Strictly speaking, the first year of the third millennium is 2001, and it is only a popular (albeit very popular) misconception that the millennium began on January 1 2000. Thus, please excuse any lapses on our behalf, and put them down to us being suckers for popular culture - although I will be sure to keep a close eye out for any further infringements in future copy.

Pro AMD

This is a reply to the very angry and frustrated G Drennan who could not get Windows 2000 to run on his AMD based PC. 'Pre-Release' means 'Beta', which in turn means 'no guarantee to work'.

I've been running Windows 2000 since the day it was released, on both an AMD K6-2/500 and an Athlon with both ALI & VIA chipsets and never had any problem.

Blame Microsoft for releasing Beta versions that hardly work, but

Competition winners

PC Authority extends a hearty congratulations to this month's competition winners. Our competitions have had a tremendous response, and we'll be sure to keep the prizes coming in the months to come.

April Mitsubishi Diamond Data CD-RW

Prize: Mitsubishi 8430A-058
CD RW Drive

Winner: Hubert McGowan
Wodonga, VIC

April XFig numerical crossword

Prize: Psion Revo

Winner: J Crowley
Coffs Harbour, NSW



The A List

If you are looking to buy a PC, peripheral or software package, then look no further. Over these three pages you will find the best buys in all categories, all proven worthy by **PC Authority**.

HANDHELD PC:

Palm IIIc

PRICE \$899

SUPPLIER Palm Inc 1800 360 558

ISSUE Recommended Award, April 2000, p98



Going from strength to strength, Palm finally introduces a colour screen to its range. It has been well worth the wait as the new Palm IIIc adds increased useability to the world's most successful PDA platform, rather than just introducing colour for the sake of it. With 8Mb of RAM and a rechargeable Lithium Ion battery, the IIIc is the most versatile Palm to date.

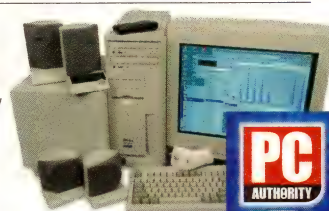
FASTEST PC:

Dell Dimension XPS B1000r SE

PRICE \$8,518

SUPPLIER Dell Computer 1300 303 273

ISSUE Excellence Award, June 2000, p84



NEW



As the category with demonstrably the highest turnover of products for obvious reasons, the Dimension XPS B1000r Special Edition is Dell's answer to the category-hogging Gateway Select 1000 reviewed last month which featured AMD's Athlon/1GHz CPU. Despite being beaten to the symbolically significant 1GHz mark however, Intel has responded with a far superior 1GHz CPU of its own. First seen in this Dell, the two make a truly dynamic duo.

IDE HARD DISK:

Western Digital Expert

PRICE \$299

SUPPLIER Servex (02) 8762 3500

ISSUE Speed Award, March 2000, p77

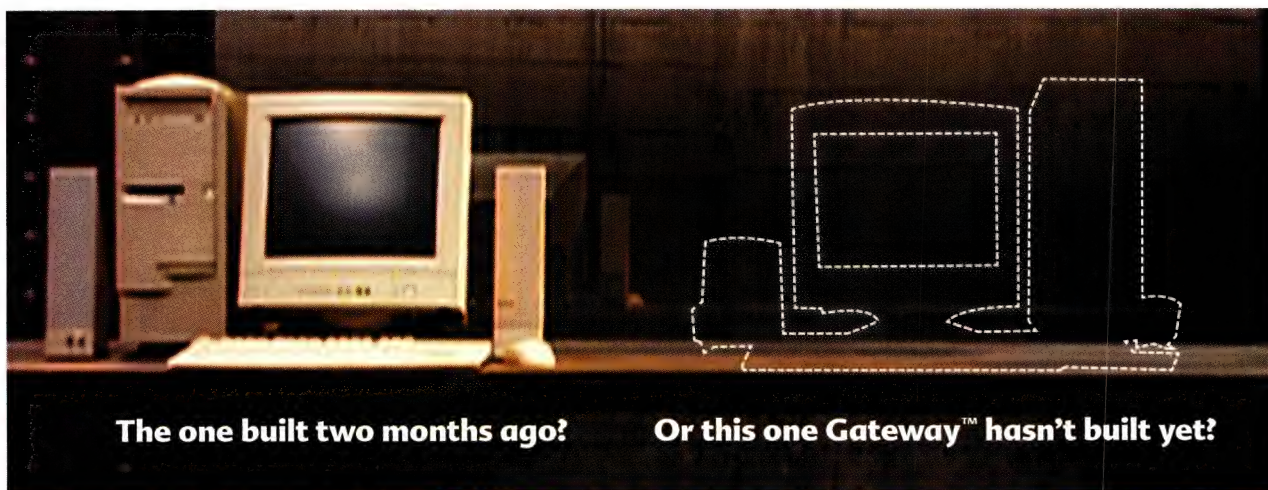
There was a time when a spindle speed of 7,200rpm was reserved to enterprise and workstation class SCSI drives. The Seagate Medallist Pro changed all this, and now there exists a new generation of affordable IDE drives based on the new ATA/66 standard that put the 7,200rpm spindle speed to good use. The Western Digital Expert combines excellent performance, reasonable capacity with an excellent price.



All the hottest products at your fingertips

Fastest PC 	Dell Dimension XPS B1000r SE	A truly epic PC in terms of specification and performance. Intel's new 1GHz Pentium III also proves to be a convincing 1GHz Athlon beater in both 2D and 3D applications.	Pentium III/1GHz, 256Kb on-die L2 cache, 256Mb of PC700 RDRAM, Intel 820 chipset, 30Gb Quantum Fireball Plus LM hard disk, 64Mb Dell GeForce 256 DDR AGP 4X graphics card, Creative SoundBlaster Live! Value sound, 12-speed NEC DVD-ROM drive, 8-speed Sony CD-RW drive, Altec Lansing ADA-885 THX speakers, 19in P991 Dell FD Trinitron monitor, Conexant 56K modem, Windows 98 SE, Microsoft Works Suite 2000, Norton AntiVirus 2000, Enthusiast Game Pack, 3yr RTB warranty. Price: \$8,518; Supplier: Dell Computer 1300 303 273; Excellence Award, June 2000, p84.
Fastest budget PC	Landmark Destiny 3 450 Value	Built for speed on a shoestring	Intel PIII/450, SuperMicro P6SBA motherboard, 64Mb SDRAM, 8.45Gb Fujitsu hard disk, Diamond Viper V770 AGP card, 15in Mitsubishi 1554e monitor, Hitachi DVD-ROM, 16-bit sound and speakers, 56K internal modem. Price: \$1,995; Supplier: Landmark IT Resources. (02) 9585 9988. Speed Award, December 1999, p53.
Motherboard	FIC KA11	Knockout price and feature set.	Slot one, VIA Apollo Pro Plus chipset, 1 AGP, 5 PC1, 2 ISA slots, 133MHz FSB. Price: \$208 Supplier: APD International (02) 9737 8271, Value Award, February 2000, p71.
Fastest notebook 	IBM ThinkPad T20	Definitively, an ideal companion for the road warrior. The T20 takes the guesswork out of computing on the go.	Pentium III/700MHz SpeedStep, 256Kb L2 cache, 128Mb of SDRAM, 14.1in TFT XGA screen, 8Mb SGRAM Savage IX8 graphics chipset, 56K V.90 modem Mini PCI card module, 12Gb hard disk, 6X DVD-ROM drive, Windows 98 SE. Dimensions (w x d x h): 304.8 x 248.9 x 33mm; weight: 2.36kg. Price: \$8,099; Supplier: IBM 13 24 26; Reviewed, Road Warrior June 2000, p9.
CD writer	Ricoh MP7040A	A great software package complements this Value Award winner.	20x/4x/4x Internal IDE CD-RW, 640Mb media capacity, EIDE interface, 2Mb cache, Adaptec Easy CD Creator and Direct CD, Photo Genie, DIY 98; Price: \$599; Supplier: Protac (02) 9637 8999; Value Award, May 1999, p74.
Removable storage	ORB 2.2Gb Drive	A high performance, low-cost means of backup and data storage.	2.2Gb EIDE disk drive, 25 MIPS DSP CPU, MR (Magneto-Resistive) head, quoted average seek time: 10ms read/12ms write, quoted maximum sustained data transfer rate: 12.2Mb/s; Price: \$399; Supplier: Business Bits (02) 9279 2420; Recommended Award, May 1999, p94.
Fastest 2D/3D graphics card 	Leadtek WinFast GeForce2 GTS	Sporting nVidia's latest powerhouse 'GPU', the WinFast GeForce2 is a titan in terms of 3D performance.	AGP 4X 2D/3D graphics card, nVidia GeForce2 GTS chipset, 32Mb DDR RAM, 350MHz RAMDAC, max resolution 2,048 x 1,536 at 16.7M at 60Hz, Windows 9x/NT drivers, Direct3D and OpenGL support, TV output, WinFastDVD, Colorific 3Deep. Price: \$649; Supplier: BCN Technology (02) 9648 0888; Recommended Award, June 2000, p92.

Which of these computers is perfect for you?



The one built two months ago?

Or this one Gateway™ hasn't built yet?

Talk to Gateway™ and you'll find out what makes us different - we listen.

Tell us what you need and we'll build you a computer to suit you. This means you'll get a Gateway™ Performance,

Essential or Solo™ PC that is perfect for you, at a value only buying direct can deliver.

It's this way of doing business that has made Gateway™ one of the world's leading computer companies.

New Powerful Performance from Gateway.™



GATEWAY™ PERFORMANCE 800 SUPERCHARGED DESKTOP

- Intel® Pentium® III Processor 800MHz
- 256Kb On-die L2 Cache
- 128MB SDRAM
- VX700 17" Monitor
- 32MB nVidia® GeForce 256™ Graphics
- 20GB Ultra ATA Hard Drive
- 16X DVD ROM Drive
- Philips Recordable/ReWriteable CD-ROM
- Sound Blaster™ Live! Value
- Boston Acoustics BA735s Speakers
- Mid Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows® 98 Second Edition
- DVD Adventure Suite
- Gateway™ 3 Year Desktop Warranty

\$4,999 Inc Tax or \$6.65/day*

GATEWAY™ PERFORMANCE 850XL ULTIMATE DESKTOP

- Intel® Pentium® III Processor 850MHz
- 256Kb On-die L2 Cache
- 128MB SDRAM
- VX900 19" Monitor
- 32MB nVidia® GeForce 256™ Graphics
- 30GB Ultra ATA Hard Drive
- 16X DVD ROM Drive
- Philips Recordable/ReWriteable CD-ROM
- Sound Blaster™ Live! Value
- Boston Acoustics® BA7500™ Dolby® Digital SST™ Speakers
- 2" Boston Acoustics Surround Sound Speakers
- Full Tower
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows® 98 Second Edition
- DVD Adventure Suite
- Gateway™ 3 Year Desktop Warranty

\$6,499 Inc Tax or \$8.65/day*

MOTHERBOARD: FIC KAI1

PRICE: \$208
SUPPLIER: APD International
(02) 9737 8277
ISSUE: Value Award, February 2000, p71

This board has all the features, accommodating any CPU for Slot 1, 133MHz FSB, AGP 4x and U-ATA/66. Sound comes on-board, and better still, it uses the VIA Apollo Pro133A chipset, which means you won't be held for ransom for RAMBUS memory. A bargain at the price and you can save even more if you opt for the version without the sound.



FASTEST NOTEBOOK: IBM ThinkPad T20

PRICE: \$8,099
SUPPLIER: IBM 13 24 26
ISSUE: Editor's Choice, Road Warrior June 2000, p9

Since the release of the SpeedStep mobile processor from Intel, notebooks have been increasing performance in far quicker succession than ever before, and the new ThinkPad T20 from IBM reaffirms the point. Running on a blazing 700MHz Pentium III processor, it is both fast and functional with a solid and robust world's first titanium construction for notebooks. The T20 is the ultimate road warrior's weapon in portable computing.


NEW

BEST VALUE SOUND CARD: Terratec Xlerate Pro

PRICE: \$199
SUPPLIER: Innovision 1300 785 795
ISSUE: Recommended Award, May 2000, p95

While many sound cards on the market demand an often unjustified premium for extra features, the Xlerate Pro delivers A3D surround sound for DirectSound 3D and DirectX at a reasonable price. This makes the card ideal for gaming enthusiasts looking to get that extra level of realism in their virtual environments. Audio producers too will find the card adequate for digital audio production in the home or business. An optical digital audio output is also provided.



FASTEST 2D/3D GRAPHICS CARD: Leadtek WinFast GeForce2 GTS

PRICE: \$649
SUPPLIER: BCN Technology
(02) 9648 0888
ISSUE: Recommended Award, June 2000, p92

Once again nVidia takes the crown for producing the fastest consumer 3D chipset on Earth, and once again Leadtek is the first out of the stocks with a card. While it might be a costly investment, the Leadtek WinFast GeForce2 is titan in terms of 3D performance, and is sure to remain a hot item for months to come.


NEW


► Mobile Storage

IBM microdrive

The microdrive is an absolute boon for users of PDAs, digital cameras, and anything else with a Type II CompactFlash slot. It works flawlessly and effortlessly in a sturdy construct, deserving our highest recommendation.

340Mb hard disk with Type II CompactFlash interface, single platter, 4,500rpm spindle speed, 128Kb buffer, Type II PC Card compatible with cradle adaptor; Dimensions: 43 x 36 x 5mm (W x D x H); Weight: 16g; Price: \$968; Supplier: IBM 13 24 26; Excellence Award, May 2000, p97.

► 3D graphics

LightWave 5.5

Fully featured and the best value professional 3D package Fully featured and the best value professional 3D package around.

Windows 95 or above, 32Mb RAM, 90Mb hard disk space; Price: \$2,695; Supplier: New Magic (03) 9532 9566; Recommended Award, December/January 1998, p78.

► Bitmap graphics

PhotoShop 5.5

With its built-in GIF and JPEG optimisation and the bundling of ImageReady, Photoshop 5.5 now handles graphics for the Web almost as well as it does photos for print.

Pentium/133, 96Mb of RAM, 125Mb of hard disk space, Windows 95 or NT 4 (Intel only); Price: \$1,495; upgrade from version 5, \$249; from version 4, \$349; Supplier: Adobe 1300 550 605; Recommended Award, May 2000, p103.

► Vector graphics

CorelDraw 9

With its new formatting options, artistic brush controls and Acrobat output, CorelDraw 9 maintains its lead as the best all-around solution.

Windows 95 or above, 32Mb RAM, 100Mb of hard disk space; Price: \$1,099; Supplier: Corel 1800 658 850; Recommended Award, November 1999, p94.

► Web authoring

Dreamweaver 3

The third version adds history list and a host of new features.

Pentium/120, 32Mb of RAM, 20Mb of hard disk space, Windows 95/98 or NT; Price: \$569 full; Supplier: Firmware (02) 4721 7211; Recommended Award, March 2000, p100.

► Web animation

Macromedia Flash 3

With major new transparency and morphing effects as well as improved HTML integration, Flash 3 sets a new standard for the production of dynamic Web sites.

Pentium/90, 24Mb of RAM, 20Mb of hard disk space, Windows 95/98 or NT 4; Price: \$569; upgrade \$199; Supplier: Firmware 1800 060 357; Recommended Award, January 1999, p96.

► Remote access

pcAnywhere

Top quality and feature packed, pcAnywhere is perfect for the user on the move.

Windows 95 or NT3.51 and above, 8Mb RAM, 16Mb of hard disk space; Price: \$239; Supplier: Symantec (02) 9850 1000; Recommended Award, March 1998 p104.

► Encyclopaedia

Encarta 2000

Encarta's new features, namely the intuitive interface, more in-depth articles and the World English Dictionary make it the most versatile reference product on the market.

Pentium 90 or higher processor, Windows 95/98 or NT version 4.0 or later with Service Pack 3, 24Mb of RAM (32 for Windows NT workstation), 155Mb of hard disk space, 16-bit sound card with speakers or headphones, 4-speed or faster CD-ROM drive; Price: \$199; Supplier: Microsoft 13 20 49. Reviewed December 1999, p110.

► Midi sequencer

Cakewalk Pro Audio 9

Looking fine with Version 9 and improved support for digital audio protection.

Pentium/200, 64Mb of RAM, Windows 95/98 or NT 4; Price: \$649.95; Supplier: ADM Distribution 1800 060 825; Reviewed March 2000, p112.

► Game

Half-Life

Simply the most fantastic 3D perspective game on the market. Half-Life's intense game play is complemented by a thoughtful and engaging story line.

Pentium II/233, 24Mb of RAM, 2-speed CD-ROM drive, 400Mb of hard disk space, sound card; Price: \$89.95; Supplier: Dataflow (02) 9417 9710; reviewed February 1999, p210.

VIDEO CAPTURE: Pinnacle DV500

PRICE \$1,999

SUPPLIER Lako Vision 1800 657 601

ISSUE Recommended Award, May 2000, p96

Real-time rendering of 2D effects and transitions for video editing has traditionally been economically out of reach for all but the most serious professionals, or the financially well-endowed. Pinnacle has taken these features and combined it with Digital Video, IEEE1394 and a breakout box and introduced it to a wider audience by pricing the entire bundle for less than \$2,000. Video buffs to broadcast professionals alike can now benefit from what the DV500 has to offer.



COLOUR INKJET PRINTER:

Epson Stylus Color 1160

PRICE \$999

SUPPLIER Epson (02) 9903 9000

ISSUE Recommended Award, April 2000, p94

Epson has consistently proven that speed and output quality does not have to be mutually exclusive in an inkjet printer. The previous A-List inkjet title holder - the Epson Stylus Color 900 - established this point. Now the philosophy has been applied to an A3 format printer. It also delivers convincing photo outputs despite not being specifically designed for the task.



15in FLAT SCREEN: Sanyo LMU-TFT150

PRICE \$2,999

SUPPLIER Sanyo (02) 8825 2822

ISSUE Quality Award, April 2000, p81

TFT technology has come leaps and bounds in the last few years, and the Sanyo LMU-TFT150 is representative of heights that this exciting new technology can offer. While the price is still high, you get unmatched image quality in terms of sharpness, detail and colour representation is excellent. If you are looking for a replacement for that desk real-estate hogging behemoth of a CRT, then look no further than the Sanyo LMU-TFT150.



MOBILE STORAGE: IBM microdrive

PRICE: \$968

SUPPLIER: IBM 13 24 26

ISSUE: Excellence Award, May 2000, p97

With the high cost of removable flash memory disproportional to the demand for mobile storage, IBM has hit a sweet spot with its incredible microdrive. Designed to Type II CompactFlash specifications, the microdrive is physically a hard drive jammed into a package about the size of a teabag and 5mm thick. Along with a PC Card adaptor, the microdrive endows its host devices - any device with a Type II PC Card slot or Type II CompactFlash card slot - with a 340Mb capacity, and in the near future, 1Gb. Unrivalled cost per megabyte and cleverly implemented.



▶ 15in flat screen	Sanyo LMU-TFT150	A hefty price tag but there can be no mistaking the quality of this sensational screen.	15in active matrix TFT screen, 1,024 x 768 maximum resolution, 0.297mm pixel pitch, analogue D-Sub inputs; Price: \$2,999; Supplier: Sanyo (02) 8825 2822; Quality Award April 2000, p81.
▶ Video capture	Pinnacle DV500	An incredible feature-set for the price. The real-time effects will speed production, the support for analogue as well as digital adds flexibility, and MPEG-2 output opens extra distribution possibilities.	PCI video capture card, FireWire connectors on card plus breakout box with RCA audio, composite and S-Video; 720 x 576 (PAL) pixel dual-field capture at up to 48KHz 16-bit; DVTools capture applet; Adobe Premiere 5.1a (plus 5.1c upgrade patch); Premiere plug-ins for DV device control, video capture, real-time 2D transitions and filters; Impressions CD-Pro software for creating MPEG-2 CDs; Sonic Foundry ACID for creating music soundtracks; Windows 98 and NT4 drivers supplied; Price: \$1,999; Supplier: Lako Vision 1800 657 601; Recommended Award, May 2000, p96.
▶ Colour ink jet printer	Epson Stylus Color 1160	The Stylus Color is stunningly fast, partly because of its Variable-Sized Droplet technology, and it produces excellent photo output results.	1,440 x 720dpi four-colour Micro Piezo A3 inkjet printer, parallel and USB interface, 100-sheet input tray, drivers for Windows 9x/NT; Price: \$999; Supplier: Epson (02) 9903 9000; Recommended Award, April 2000, p94.
▶ IDE hard drive	Western Digital Expert	The age of affordable, high performance 7,200rpm IDE hard disks is here, and the Western Digital Expert is representative of the best this new age can offer.	UltraATA/66 hard disk, 13.6Gb unformatted capacity, 7,200rpm spindle speed, 2Mb data buffer; Price: \$299; Supplier: Servex (02) 8762 3500; Speed Award March 2000, p77.
▶ PDA	Palm IIIc	Building on a successful platform, the IIIc demonstrates why Palm devices consistently hold the biggest market share around the world. And now that it has colour...	DragonBall EZ 20MHz processor, 8Mb of RAM, 2Mb of ROM, 256-colour TFT display, Lithium Ion rechargeable battery, docking cradle and charger. Software: Graffiti, diary address book, expenses, off-line mail reader, memo pad, to-do list, AvantGo Web browser, HotSync, games; Price: \$899; Supplier: Palm, Inc 1800 360 558; Recommended Award, April 2000, p98.
▶ Scanner	Umax Astra 2400S	A big berth a flatbed scanner, big on features, big on performance and big on price.	2,400 x 600dpi optical resolution, 36-bit colour CCD, SCSI interface, card and cable included, Includes Vistascan and Adobe Photoshop LE; Price: \$1,395; Supplier: CEA (08) 9353 3411; Quality Award, January 2000, p80.
▶ Scanner under \$300	Genius ColorPage-Vivid Pro II Film	For the budget-minded who don't mind waiting for a scan.	600 x 1,200dpi optical resolution, parallel port interface, 36-bit colour CCD, includes MGI PhotoSuite SE, Textbridge Classic OCR and Adobe PhotoDeluxe; Price: \$150; Supplier: AKA Corporation 1300 655 911; Value Award, January 2000, p76.
▶ 17in monitor	Sony CPD-E200	The flattest screen and most vibrant display in a CRT monitor.	17in Trinitron, 0.25mm grille pitch, 1,600 x 1,200 @ 60Hz; Price: \$965; Supplier: Sony 1800 226 429; Quality Award winner, November 1999, p75.
▶ Digital camera	Nikon CoolPix 950	An outstanding camera with excellent image quality. This camera has solid features as well as superb upgrade potential.	1,600 x 1,200 pixel maximum resolution, 48Mb Compact Flash removable storage, 2in colour LCD display, built-in flash; Price: \$2,149; Supplier: Maxwell Optical (02) 9390 0200; Quality Award, December 1999, p75.
▶ Best value sound card	Terratec Xlerate Pro	A top 3D sound card which should satisfy gamers on a budget. Great sound, good 3D effects and good value. Bundled with several applications plus an incredible collection of shareware.	Pentium/166MHz or higher, PCI slot, 16Mb of RAM (32Mb recommended), 20Mb of hard disk space, powered speakers or headphones, Windows 9x/NT/2000 (support via driver download from the Web); Price: \$199; Supplier: Innovision 1300 785 795; Recommended Award, May 2000, p95.

Gateway™ Desktop PCs.

GATEWAY NEO™ EASY ALL-IN-ONE

- Intel® Celeron™ Processor 400 MHz
- 128KB Cache
- 64MB SDRAM
- 15" Monitor
- Intel® 3D Graphics
- 4.3GB Ultra ATA Hard Drive
- 40X Max Variable CD-ROM
- 3.5" Diskette Drive
- Stereo Audio and Speakers
- 56K Internet/Fax Modem
- USB Keyboard and Mouse
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- Microsoft® Works Suite
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\$1,399 Inc Tax or \$1.90/day*

GATEWAY™ ESSENTIAL 466C FAMILY DESKTOP

- Intel® Celeron™ Processor 466MHz
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- EV500 15" Monitor
- Integrated Intel® 3D Graphics
- 10GB Ultra ATA Hard Drive
- 20x Min/48x Max CD ROM Drive
- Integrated Stereo Audio
- GCS-200 Speakers by Cambridge® SoundWorks
- Mini Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows 98 Second Edition
- Gateway™ 1 Year Desktop Warranty

\$1,499 Inc Tax or \$2.00/day*

GATEWAY™ ESSENTIAL 600SEC COMPLETE VALUE PC

- Intel® Celeron™ Processor 600MHz
- 128Kb Level 2 Cache
- 64MB SDRAM
- EV500 15" Monitor
- Integrated Intel® 3D Graphics
- 10GB Ultra ATA Hard Drive
- 20x Min/48x Max CD ROM Drive
- Integrated Stereo Audio
- GCS-200 Speakers by Cambridge® SoundWorks
- Mini Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows® 98 Second Edition
- Gateway™ 1 Year Desktop Warranty

\$1,799 Inc Tax or \$2.40/day*

GATEWAY™ ESSENTIAL 600C GREAT VALUE PC

- Intel® Celeron™ Processor 600MHz
- 128Kb Level 2 Cache
- 64MB SDRAM
- EV500 15" Monitor
- Integrated Intel® 3D Graphics
- 10GB Ultra ATA Hard Drive
- 16X DVD ROM Drive
- Integrated Stereo Audio
- GCS-200 Speakers by Cambridge® SoundWorks
- Mini Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows® 98 Second Edition
- Gateway™ 1 Year Desktop Warranty

\$1,999 Inc Tax or \$2.70/day*

GATEWAY™ ESSENTIAL 650 AFFORDABLE POWERFUL PC

- Intel® Pentium® III Processor 650MHz
- 256Kb On-die L2 Cache
- 64MB SDRAM
- EV500 15" Monitor
- Integrated Intel® 3D Graphics
- 10GB Ultra ATA Hard Drive
- 20x Min/48x Max CD ROM Drive
- Sound Blaster™ Audio PCI™ 128D
- GCS-200 Speakers by Cambridge® SoundWorks
- Mini Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows® 98 Second Edition
- Gateway™ 1 Year Desktop Warranty

\$2,099 Inc Tax or \$2.80/day*

GATEWAY™ PERFORMANCE 650LS FEATURE POWERPACKED PC

- Intel® Pentium® III Processor 650MHz
- 256Kb On-die L2 Cache
- 64MB SDRAM
- EV700 17" Monitor
- 16MB AGP Graphics Accelerator
- 10GB Ultra ATA Hard Drive
- 20x Min/48x Max CD ROM Drive
- Integrated Stereo Audio
- GCS-200 Speakers by Cambridge® SoundWorks
- Mid Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows 98 Second Edition
- Gateway™ 3 Year Desktop Warranty

\$2,499 Inc Tax or \$3.35/day*

GATEWAY™ PERFORMANCE 650 SUPERSPEED DESKTOP

- Intel® Pentium® III Processor 650MHz
- 256Kb On-die L2 Cache
- 64MB SDRAM
- EV700 17" Monitor
- 32MB nVidia TNT-2 M64 SDRAM
- 10GB Ultra ATA Hard Drive
- 16X DVD ROM Drive
- Sound Blaster™ Live! Value
- Boston Acoustics BA735s Speakers
- Mid Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows® 98 Second Edition
- Gateway™ 3 Year Desktop Warranty

\$2,699 Inc Tax or \$3.60/day*

GATEWAY™ PERFORMANCE 700 POWER-PACKED PC

- Intel® Pentium® III Processor 700MHz
- 256Kb On-die L2 Cache
- 128MB SDRAM
- VX700 17" Monitor
- 32MB nVidia TNT-2 M64 SDRAM
- 20GB Ultra ATA Hard Drive
- 16X DVD ROM Drive
- Sound Blaster™ Live! Value
- Boston Acoustics BA735s Speakers
- Mid Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft® Works Suite 2000
- Microsoft® Windows® 98 Second Edition
- Gateway™ 3 Year Desktop Warranty

\$3,499 Inc Tax or \$3.35/day*



GATEWAY™ PERFORMANCE 850XL

*Cost per day of purchasing the above products through Gateway's finance partner (3-year term, interest at 26.3% p.a.); credit to approved customers only; terms, conditions, fees and charges apply.

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PROFILE SE

OFFICE SPACE SAVER

- 15" Active Matrix Display (TFT)
- Intel® Pentium® III Processor 500 MHz
- 64MB SDRAM
- 256k Level 2 Cache
- 4MB Video Cache
- 6GB Ultra ATA Hard Drive
- Integrated 10xMin / 24xMax CD ROM
- Integrated 1.44MB Floppy Disk Drive
- 16-bit Stereo sound, internal speakers
- Integrated 3Com 10/100 ethernet networking
- 2 Type II or 1 Type III PCMCIA slots
- Windows keyboard
- Microsoft® Intellipoint Mouse
- Microsoft® Windows® 98 Second Edition
- MS Works Suite 2000
- Gateway™ 1 Year Standard Warranty

\$4,299 Inc Tax or \$5.75/day*



PROFILE 2

PICTURE PERFECT

- 15" Active Matrix Display (TFT)
- Intel® Celeron™ Processor 500MHz
- 64MB SDRAM
- 128k Level 2 Cache
- 4MB Video Cache
- 20GB Ultra ATA Hard Drive
- Integrated 6x DVD-ROM drive
- Integrated 1.44MB Floppy Disk Drive
- Soft audio controller with internal speakers
- Integrated 56K Modem
- Integrated 10 bit networking
- Windows USB keyboard
- USB Mouse
- Microsoft® Windows® 98 Second Edition
- Microsoft® Works Suite
- Gateway™ 1 Year Standard Warranty

\$3,999 Inc Tax or \$5.35/day*

Gateway™ Notebooks.

SOLO™ 2150LS

BEST VALUE NOTEBOOK

- 12.1" Active Matrix Display (TFT)
- Intel® Celeron™ Processor 450MHz
- 32MB SDRAM
- 128k Level 2 Cache
- 4MB 2X AGP Graphics Accelerator
- 6GB Ultra ATA Hard Drive
- Integrated 1.44MB Floppy Disk Drive
- Integrated 10xMin / 24xMax CD ROM
- 16-bit Stereo sound, internal speakers
- Integrated 56k Data/Fax Modem
- 2 Type II or 1 Type III PCMCIA slot
- Li-ion battery & 70W AC Adapter
- Microsoft® Works Suite 2000
- Microsoft® Windows® 98 Second Edition
- 312 x 258 x 42.8mm - 2.65kg
- Gateway™ 1 Year Notebook Warranty

\$2,999 Inc Tax or \$4.00/day*

SOLO™ 2150CS

VALUE NOTEBOOK

- 12.1" Active Matrix Display (TFT)
- Intel® Pentium® III Processor 500 MHz
- 64MB SDRAM
- 256k Level 2 Cache
- 4MB 2X AGP Graphics Accelerator
- 6GB Ultra ATA Hard Drive
- Integrated 1.44MB Floppy Disk Drive
- Integrated 10xMin / 24xMax CD ROM
- 16-bit Stereo sound, internal speakers
- Integrated 56k Data/Fax Modem
- 2 Type II or 1 Type III PCMCIA slot
- Li-ion battery & 70W AC Adapter
- Microsoft® Windows® 98 Second Edition
- Microsoft® Works Suite 2000
- 312 x 258 x 42.8mm - 2.65kg
- Gateway™ 1 Year Notebook Warranty

\$3,599 Inc Tax or \$4.80/day*

SOLO™ 3300SE

ULTRA THIN NOTEBOOK

- Only 1.66kg* 25.7mm thin
- Metallic blue magnesium chassis
- 12.1" SVGA Active Matrix Display (TFT)
- Intel® Pentium® III Processor 500 MHz
- 64MB SDRAM
- 256k Level 2 Cache
- 2.5MB AGP Graphics Accelerator
- 6GB Ultra ATA Hard Drive
- External 10xMin / 24xMax CD ROM
- 16-bit Stereo sound, internal speaker
- Integrated 56k Data/Fax Modem
- Integrated 3Com 10/100 ethernet network
- 1 Type II PCMCIA slot
- Lithium Ion battery (31Watt-Hr) & AC Adaptor
- Microsoft® Windows® 98 Second Edition
- Microsoft® Works Suite 2000
- Free double memory with upgrade to Windows 2000(\$175)
- Gateway™ 1 Year Notebook Warranty

\$4,599 Inc Tax or \$6.15/day*

NEW

SOLO™ 9300XL

AWARD WINNING NOTEBOOK

- 15.7" SXGA Active Matrix Display (TFT)
- Intel® Pentium® III Processor 600 MHz
- 128MB SDRAM
- 256k Level 2 Cache
- ATI RAGE Mobility 3D Graphics Accelerator
- 2X AGP with 8MB SGRAM
- 12GB Ultra ATA Hard Drive
- Integrated 1.44MB Floppy Disk Drive
- Integrated 6x DVD-ROM
- 16-bit Stereo sound, internal speakers
- Integrated 56k Data/Fax Modem
- 2 Type II or 1 Type III PCMCIA slot
- 12-cell Lithium Ion battery & 70W AC Adaptor
- Executive Leather Carry Case
- Microsoft® Windows® 98 Second Edition
- Microsoft® Works Suite 2000
- 334 x 286 x 42mm - 3.9kg
- Gateway™ 1 Year Notebook Warranty

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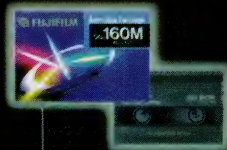
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● DLTtape™ IV



● DDS 4



● D-8



● Klik

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READERSHIP SURVEY

Readership Survey

It's your magazine so tell us what you think...
Don't hold back – let us have it - but do it online!

P *C Authority* strives to bring you a magazine with no equal in both editorial excellence and value for money. *PC Authority* exists because of you and for you.

Please take five minutes of your time and tell us what you think

of the magazine, the CD and the Web site. Enter online at www.pcauthority.com.au where there are some fantastic additional prizes and questions.

1. Typically I buy this number of PC titles per month:

1 2 3 4 5 6

2. I buy less PC magazines than I used to.

Yes No

3. I buy *PC Authority* because of:

1. The editorial content and style
2. A particular product review or Labs
3. The cover CD
4. The price represents best the value for money
5. Out of habit
6. The other magazines are much worse
7. The others are too expensive

4. Despite its price increase do you still think *PC Authority* represents great value for money?

Yes No

5. If 'No' which computer magazines do you consider to be the best value for money?

.....

6. All PC titles are becoming too expensive

Yes No

7. Would you rather pay less for *PC Authority* and not receive a CD?

1. Yes, if it went back to \$5.95
2. No, the CD is too important

8. Would you pay more for *PC Authority* if it had two or more CDs?

1. Yes I love CDs
2. Depends on the content of the CD
3. No, I have had enough of CDs

9. The price increase makes me question far more closely which magazine I buy each month.

Yes No

10. Before buying, the most important aspect of any magazine is:

1. CD
2. Front cover
3. Exclusive first to market articles and reviews

11. Technology is moving at such a pace that:

1. I'm making less effort to keep up
2. *PC Authority* is even more essential

12. The GST, on top of existing magazine pricing, is too much. As a result:

1. I will stop buying them
2. I will be far more selective
3. It is unavoidable

13. I buy my magazines from:

1. Supermarkets
2. Convenience stores
3. Newsagents
4. Anywhere

14. I think a Web site for *PC Authority* is:

1. Essential
2. Useful
3. No interest

15. The existing *PC Authority* Web site is:

1. Well designed
2. Same as the others
3. Poor

16. The new CD format is a:

1. Great improvement
2. Indifferent
3. Preferred the old style

Win a Gateway PC!

You stand the chance to win a fantastic prize: the Gateway Essential 600 PC.

Take a couple of minutes to tell us how you feel the magazine has developed over the last year. Do you like the redesigned *PC Authority* or did you prefer the old version? Give us your views and you go into the hat to win the awesome Gateway Essential 600c. The winner will be notified by email so don't forget to include it in your response.



Gateway Essential 600

- Intel Celeron Processor 600MHz
- 128Kb Level 2 Cache
- 64Mb SDRAM
- EV500 15in Monitor

- GCS-200 Speakers by Cambridge SoundWorks
- Mini Tower Case
- 56K Data/Fax/Voice Modem
- Microsoft Works Suite 2000
- **Plus lots more**

17. *PC Authority* is a:

1. Premium product at great price
2. Premium product at premium price
3. No longer a premium product

18. *PC Authority* is the best product reviewer of all the computer magazines.

1. True
2. Not true, the best magazine is
3. Possibly true, I don't buy it for the reviews

19. *PC Authority* is still a far better computer magazine than the others.

1. True
2. Used to be true but not sure now
3. Not true

20. What are the most important qualities to you when making a decision to purchase a PC?

1. Speed
2. Power
3. Quality
4. Value for money
5. Design
6. Features
7. Upgradeability
8. Strong reviews from magazines like *PC Authority*

21. If you were interested in purchasing a notebook PC, which of the following qualities would you consider to be the most important?

1. Speed
2. Size
3. Style and colour
4. Supports wireless technology
5. Desktop equivalent
6. Performance

22. What do you look for in a PC manufacturer when you decide to purchase a PC?

1. Brand reputation
2. Cutting edge development
3. Excellent value
4. Delivery time
5. Technical support
6. Warranties and after sales service

23. Do you prefer a hard plastic CD case or a soft sleeve?

- Hard Soft

24. Are you interested in reading about Linux?

- Yes No

25. Are you interested in reading about games and gaming consoles?

- Yes No

26. Do you find the supplement magazines that come with *PC Authority* of value?

- Yes No

27. Which supplements have you read?

1. Tech Support
2. Road Warrior
3. Focus On GST

28. Apart from CDs, what else would you like to see as a cover mount?

.....

29. Do you feel the *PC Authority* CD is still the strongest in terms of content?

1. Yes, it is the best
2. No, it is not as good as others
3. No, but CDs are not that important

30. How do you feel about *PC Authority's* new design?

1. I prefer it now
2. I preferred it the way it was
3. I have no opinion

31. Having exclusive product reviews is hugely important to me as a reader.

- True False

32. The best way to improve *PC Authority* would be to

.....
.....
.....
.....
.....
.....
.....
.....

33. I use my PC for:

1. Work
2. Entertainment
3. Both

34. My current job status is:

1. Director/Partner/Business owner
2. General Manager
3. Middle management/Executive
4. Self employed / freelance
5. IT specifier/IT manager
6. Student
7. Pensioner
8. Other

How to submit your survey:

- 1 Fill it out online at www.pcauthority.com.au
- 2 Send it by fax on (02) 9317 3559
- 3 Send your survey by snail mail to PC Authority, PO Box 275, Beaconsfield, NSW, 2015

Email

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Subscription No:

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Ziff-Davis 3D WinBench™ 99 v1.2 (Null Driver) Microsoft® Win 98

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AMD Athlon™ 900MHz	5010.0
AMD Athlon™ 800MHz	4684.0
Pentium® III 800MHz	4073.3

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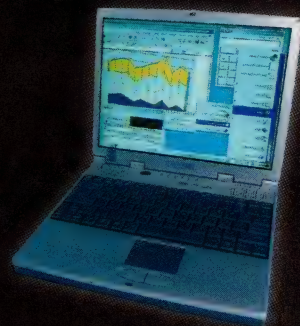
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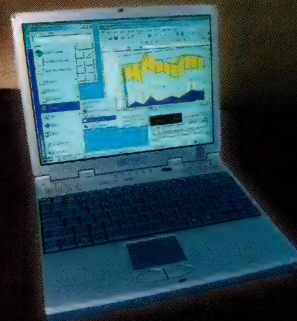
Platinum Series Celeron 500 14.1" TFT Active Screen



**MEGAIMAGE
NOTEBOOK**

Intel® Celeron™ 500 Mhz
128Mb SDRAM
128k Cache
12GB Hard Disk Drive
1.44 Floppy Disk Drive
Intel BX 439BX
(1024x768)
Neo Magic256AV
2 x PCMCIA Slots
56k PCMCia Modem (optional)
Serial Infrared port (FIR), USB
connector
TV Port, ext Monitor port, ext
mouse & keyboard port
DVD ROM Drive
Touch Pad
Maestro PCI Sound Card
Battery (Li-ion Battery)
MS Win 98 Loaded & Licensed
L x W x T = 310 x 260 x 45mm
2.5 Kgs
12 Months Limited Warranty

Diamond Series Celeron 466 12.1" TFT Active Screen



**MEGAIMAGE
NOTEBOOK**

Intel® Celeron™ 466 Mhz
64 MB SDRAM
128k Cache
6GB Hard Disk Drive
1.44 Floppy Disk Drive
Intel BX 439BX
(1024x768)
Neo Magic 256AV
2 x PCMCIA Slots
56k PCMCia Modem (optional)
Serial Infrared port (FIR), USB
connector
TV Port, ext Monitor port, ext mouse
& keyboard port
24 x CD ROM Drive
Touch Pad
Maestro PCI Sound Card
Battery (Ni-MH)
MS Win 98 Loaded & Licensed
L x W x T = 310 x 260 x 45mm
2.5 Kgs
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LABS 1

The Entertainer

From the office to the study to the lounge room - where does the entertainment PC belong? The Labs team takes a few home.



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Back in 1997 Intel CEO Andy Grove made it clear that in order to boost personal computer sales and usage, Intel was specifically targeting the television as its direct competition in the home. To quote Dr. Grove: 'we are in a war for eyeballs because people have the discretionary choice of either watching television or working at home, entertaining themselves, or playing with their personal computer.' And this was only the beginning of what we now call the 'entertainment PC',

which has grown in popularity as increases in performance and capabilities mean that the PC can start moving out of the office or study, and into the lounge room. Only in 1998, an Intel document outlining PC usage statistics in the US stated that 'a majority of PC consumers today use the computer for playing games, educational or computer-assisted learning, and surfing the Internet.'

This month the *PC Authority* Labs takes a close look at the current state of play in terms of home entertainment PCs, and runs them through our rigorous testing and evaluation procedures to see whether they are worth your hard earned dollars. Some consider the ultimate test of a home entertainment PC is whether you would consider bringing one of these into your lounge room. From this Labs, it is apparent that while these PCs can certainly keep you occupied and entertained for hours on end with DVD movies, 3D games, Internet browsing and thumping audio, they are not yet ready for the lounge room or suitable as replacements for the good ol' telly.

Our basic specifications to vendors this month consisted of a 600MHz CPU or better; 128Mb RAM; 17in monitor or larger; and DVD-ROM drive. Most importantly there was a price cap of \$5,000, which allows a fair amount of room for the manufacturers to mix and match, whether they choose to emphasise performance or to pack in every bell and whistle possible. The result of this high specification and price point is that each and every system on test excelled in some way, although many represent a compromise in some area. Would you toss your telly for one? Read on and you decide.

Labs Editor David Lin

Contributors Tim Dean, Philip Moore

Chris Walsh



harman/kardon

Specifications & features

Manufacturer and model name	Dell Dimension XPS B733r	Digital Star Power G733GX	Forté Altitude	Gateway Performance 800	IPS A-20	MicroTech Titan 600	VALUE
▷ Price (including tax)	\$4,999	\$3,899	\$3,900	\$4,999	\$4,290	\$4,999	
▷ Credit card surcharge	N/A	N/A	N/A	N/A	2.0%	2.0%	
▷ Shipping charges	\$75	Varies nationwide	Varies nationwide	\$75	Varies nationwide	Varies nationwide	
▷ Supplier	Dell Computer	Digital Star Computers	Forté Computers	Gateway	IPS Intelligent Printing Systems	MicroTech Corporation	
▷ Phone	1300 303 275	1800 800 628	1300 368 922	1800 500 338	(02) 9923 1777	(02) 9648 1818	
▷ Internet	www.dell.com.au	www.digitalstar.com.au	www.fortecomputers.com.au	www.au.gateway.com	www.ipsply.com.au	www.microtec8.com	
▷ Warranty	1yr on-site, 3yr parts	2yr parts, 3yr labour	2yr RTB	3yr RTB	1yr on-site	2yr RTB	
CASE							
▷ Case type	Midi tower	Midi tower	Midi tower	Midi tower	Midi tower	Midi tower	
▷ height x width x depth (mm)	435 x 160 x 422	410 x 190 x 420	415 x 200 x 400	478 x 186 x 438	440 x 160 x 425	417 x 220 x 428	
▷ PSU rating (Watts)	200	250	250	200	250	250	
▷ Mains passthrough plug	N	Y	Y	N	N	Y	
FREE DRIVE BAYS							
▷ Front panel 5.25in	0	1	2	1	2	1	
▷ Internal 5.25in	0	0	0	0	0	0	
▷ Front panel 3.5in	2	2	1	1	0	1	
▷ Internal 3.5in	1	1	0	2	2	0	
MOTHERBOARD							
▷ Make and model	Dell VC820	Gigabyte GA-6CXC	Asus P3V4X	Gateway BX system board	Tyan S2380 Trinity K7	MicroStar MSI-6301	
▷ Processor type	Pentium III/733MHz	Pentium III/733MHz	Pentium III/600MHz	Pentium III/800MHz	Athlon/900MHz	Pentium III/600MHz	
▷ Processor socket	Slot 1	Slot 1	Slot 1/PGA370 riser	Slot 1	Slot A	Slot 1/PGA370 riser	
▷ Chipset	Intel 820	Intel 820	VIA Apollo Pro133A	Intel 440BX	VIA KX-133	Intel 820	
▷ Maximum processor supported	800MHz	800MHz	1GHz	800MHz	1GHz	733MHz	
▷ Bus speed	133MHz	133MHz	133MHz	100MHz	200MHz	133MHz	
▷ BIOS type and version	Intel/AMI	AMI 1.2	Award 6.0	Phoenix 4.0 release 6.0	Award 6.0	AMI 1.1	
BUSES							
▷ AGP free/total	0/1	0/1	0/1	0/1	0/1	0/1	
▷ PCI free/total	2/5	3/5	4/6	3/5	5/6	1/5	
▷ 16-bit ISA free/total	0/0	0/0	1/1	1/1	1/1	1/1	
▷ Shared slots	0	0	1	1	1	1	
MEMORY							
▷ RAM installed	128Mb PC700 RDRAM	128Mb PC133 SDRAM	128Mb PC133 SDRAM	128Mb PC100 SDRAM	128Mb PC133 SDRAM	128Mb PC133 SDRAM	
▷ Maximum RAM	512Mb	768Mb	2Gb	768Mb	768Mb	512Mb	
▷ DIMM sockets free/total	N/A	2/3	3/4	2/3	2/3	2/3	
▷ RIMM sockets free/total	1/2	N/A	N/A	N/A	N/A	N/A	
▷ Secondary cache size	256Kb	256Kb	256Kb	256Kb	512Kb	256Kb	
▷ Secondary cache to CPU bus speed	733MHz	733MHz	600MHz	800MHz	300MHz	600MHz	
HARD DISK							
▷ Make and model	IBM Deskstar 34GXP	Seagate Barracuda ATA	Quantum Fireball Plus LM	IBM Deskstar 34GXP	IBM Deskstar 34GXP	Quantum Fireball Plus KX	
▷ Size (unformatted)	27.3Gb	28.5Gb	15Gb	20.5Gb	20.5Gb	20.5Gb	
▷ Type	UltraATA/66	UltraATA/66	UltraATA/66	UltraATA/33	UltraATA/66	UltraATA/66	
▷ Controller and bus	Integrated EIDE	Integrated EIDE	Integrated EIDE	Integrated EIDE	Integrated EIDE	Integrated EIDE	
INTERFACES							
▷ Ports (see key below)	15, 1P, 1G, 2USB	25, 1P, 1G, 2USB	25, 1P, 1G, 2USB	25, 1P, 1G, 2USB	25, 1P, 1G, 2USB	25, 1P, 1G, 2USB	
▷ Mouse type	4-btn 1-wheel PS/2	2-btn 1-wheel PS/2	4-btn 1-wheel PS/2 or USB	2-btn 1-wheel PS/2	2-btn 1-wheel PS/2	2-btn 1-wheel PS/2	
▷ Keyboard type	Dell QuietKey 104 PS/2	Microsoft Internet 104-key PS/2	Microsoft Internet 104-key PS/2	Gateway-branded 104-key PS/2	Microsoft Internet 104-key PS/2	Microsoft Internet 104-key PS/2	
GRAPHICS							
▷ Make and model	Dell GeForce 256	Leadtek WinFast GeForce256 DDR	Matrox G400 DualHead	Gateway GeForce 256	Leadtek WinFast GeForce 256 DDR	Creative 3D Blaster GeForce 256	
▷ Chipset	nVidia GeForce 256	nVidia GeForce 256	Matrox G400	nVidia GeForce 256	nVidia GeForce 256	nVidia GeForce 256	
▷ Chip bus size	128-bit	128-bit	2 x 128-bit	128-bit	128-bit	128-bit	
▷ Bus	AGP 4X	AGP 4X	AGP 4X	AGP 4X	AGP 4X	AGP 4X	
▷ Memory installed	64Mb DDR	32Mb DDR	32Mb	32Mb	32Mb DDR	32Mb	
▷ Max resolution x colour @ refresh rate	2,048 x 1,536 x 262K @ 60Hz	2,048 x 1,536 x 262K @ 60Hz	2,048 x 1,536 x 16.7M @ 85	2,048 x 1,536 x 262K @ 60Hz	2,048 x 1,536 x 262K @ 60Hz	2,048 x 1,536 x 262K @ 60Hz	
▷ 3D acceleration	Direct3D, OpenGL	Direct3D, OpenGL	Direct3D, OpenGL	Direct3D, OpenGL	Direct3D, OpenGL	Direct3D, OpenGL	
MONITOR							
▷ Make and model	Dell M990	Philips 107s	Hitachi CM766ET	Gateway VX700	Philips 107s	NEC MultiSync V920	
▷ Dot pitch (mm)	0.26	0.23-0.27	0.22	0.25	0.23-0.27	0.26	
▷ Nominal tube diagonal (in)	19	17	19	17	19	19	
▷ Measured screen diagonal (in)	18	16	18	16	16	18	
▷ Max resolution (W x H x Hz)	1,600 x 1,200 x 75	1,024 x 768 x 88	1,600 x 1,280 x 85	1,600 x 1,200 x 65	1,024 x 768 x 88	1,600 x 1,200 x 76	
SOFTWARE SUPPLIED							
▷ Operating system	Windows 98	Windows 98	Windows 98	Windows 98	Windows 98	Windows 98	
▷ Main titles	Sports Car GT, Descent 3, Baldur's Gate, Grim Fandango, Freespace 2, Railroad Tycoon, Ultimate DVD Demo, Dell Diagnostics	Leadtek DVD Magic, Riven, Pioneer DVD Express	Bitware for Windows	Revisent DVD Player, Norton Antivirus, Microsoft Works 99, Intel Web Outfitter, Baldur's Gate, Legacy of Time, Descent: Freespace, Gateway utilities	Microsoft Works 2000, Bitware, Hot Office, VocalTec Internet Phone, Leadtek DVD Magic, Rapid Reader	Lotus SmartSuite Millennium, TrueBlue PC-DVD player, Half-Life, GeForce Demo CD	
PERIPHERALS							
▷ DVD drive and speed	NEC 12x	Pioneer 16x	Pioneer 16x	NEC 8x	Mitsubishi 10x	Sony 6x	
▷ Hardware decoder	Quadrant	N	N	N	N	TrueBlue Quasar VF64-DVS	
▷ Sound card	Creative SoundBlaster Live! Value	Creative SoundBlaster Live! Value	Xitel Storm Platinum AU8830	Creative SoundBlaster Live! Value	Integrated Crystal CS4297 chipset	Creative SB Live! Platinum	
▷ Speakers	Altec-Lansing ADA885	Altec-Lansing ACS54	Altec-Lansing ACS54	Boston Acoustics Digital BA735	Genius SW-103	Altec-Lansing ACS45.1	
▷ Speaker output rating (W RMS)	4 x 15w (satellite)/1 x 60w (sub)	4 x 5w (satellite)/1 x 20w (sub)	4 x 5w (satellite)/1 x 20w (sub)	N/A	40	2 x 12 (satellite)/1 x 20 (sub)	
▷ Speaker configuration	4.1	4.1	4.1	2.1	4.0	2.1	
▷ Sound compliance	THX, EAX	EAX	A3D	EAX	N/A	EAX	
▷ Modem and speed	N/A	Conexant 56K internal	Netcomm 56K internal	56K internal	Mitsubishi 56K internal	SmartLink HAMR5603 56K AMF	
▷ Backup device	Sony 8x CD-RW	N/A	N/A	Philips 8x CD-RW	N/A	N/A	
▷ Other	Microphone	N/A	N/A	Microphone	N/A	See review for details	

Key: s = fast 16550 UART serial port / p = enhanced parallel (ECP or EPP) / g = game port / usb = universal serial bus RTB = Return to base

PC Authority benchmarks



Testing PCs to give meaningful results that accurately represent a system's performance in the real world is not an easy task. A PC is more than just the sum of its parts, it has to be considered as a whole and tested as such.

For this reason the *PC Authority*

Benchmarks use the full versions of several highly popular real world applications: Adobe Photoshop 5; CorelDRAW 8; FileMaker Pro 4.1; Microsoft Access 2000; Microsoft Excel 2000; and Microsoft Word 2000 (for more information on each application and the details on the individual tests see *PC Authority* Benchmarks, issue 30, p48). By using the full versions of real world applications we test the PC as a whole entity, and don't just report on its component parts like CPU, memory or hard disk alone and in isolation. This means that the results from the PC Authority Benchmarks accurately represent each PC's real world performance when using the kinds of applications that you use every day. To test 3D gaming performance we use 3DMark2000 Pro from MadOnion (www.madonion.com), which is a detailed synthetic Direct3D benchmark based around the advanced MAX Payne 3D engine. This benchmark tests each component feature of the graphics sub-system, as well as running the whole system through simulations of full games to give an accurate indication of your PC's real world performance in 3D.

Shark fishing

sharkfishing@pcauthority.com.au

It is *PC Authority* Labs policy that all products featured must be made available to the public for the exact specification and price for at least four weeks from the publication date of the magazine.

Although we want to ensure that you will be able to buy the exact machine that we review, manufacturers are free to increase the features, such as the hard disk size or add more RAM, or lower the price for the same specification.

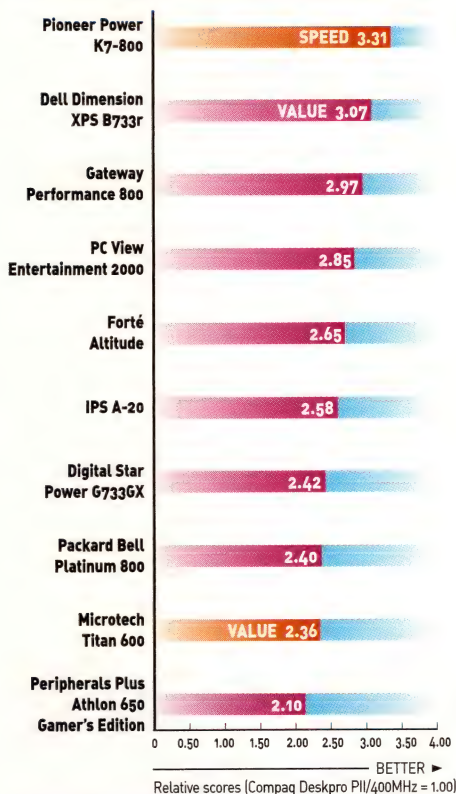
The Labs team will perform a series of spot tests each month to ensure the integrity of the manufacturers featured in the previous month and if we detect any infringements, we'll report it here. *PC Authority* wishes to report an error of omission from the May issue. We reported the Deltacom Bohemia 600E from Alfa Computers without any application software. In fact the Bohemia came bundled with Microsoft Works 2000 suite. This has not affected any of the awards or product star ratings. Our apologies to readers and Alfa Computers for this mistake.



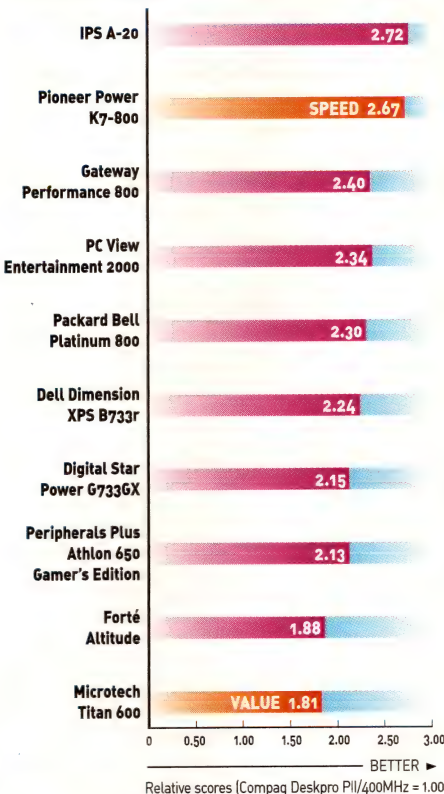
Packard Bell Platinum 800	PC View Entertainment 2000	Peripherals Plus Athlon 650 Gamer's Edition	Pioneer Power K7-800
\$4,999 Dependent on dealer Dependent on dealer Packard Bell 1800 647 900 www.packardbell.com.au 3 month on-site, 1yr P&L	\$3,190 Nil Varies nationwide PC View (02) 9966 0066 www.pview.com.au 2yr RTB	\$3,995 2.5% Varies nationwide Peripherals Plus (02) 9630 3166 www.perplus.com.au 3yr on-site	\$4,999 2.5% Varies nationwide Pioneer Computers (02) 9690 2888 www.pioneercomputers.com.au 2yr parts, 5yr labour
Midi tower 427 x 203 x 440 235 Y	Midi tower 415 x 200 x 425 250 Y	Midi tower 410 x 200 x 425 250 Y	Midi tower 430 x 190 x 410 250 Y
0 1 2 0	2 0 1 0	1 0 1 0	2 0 0 0
MicroStar MSI-6199VA Pentium III/800MHz Slot 1 VIA Apollo Pro133A 800MHz 100MHz Award 4.51	Shuttle AL61 Athlon/700MHz Slot A AMD 751/756 750MHz 200MHz Award 6.0	MicroStar MSI-K7 Pro Athlon/650MHz Slot A AMD 751/756 800MHz 200MHz AMI 1.1	MicroStar MSI-K7 Pro Athlon/800MHz Slot A AMD 751/756 800MHz 200MHz AMI 1.21
0/1 3/5 2/2 1	0/1 3/5 0/0 0	0/1 5/6 1/1 1	0/1 5/6 1/1 1
128Mb PC133 SDRAM 768Mb 2/3 N/A 256Kb 800MHz	128Mb PC133 SDRAM 768Mb 2/3 N/A 512Kb 280MHz	128Mb PC133 SDRAM 768Mb 2/3 N/A 512Kb 325MHz	128Mb PC133 SDRAM 768Mb 1/3 N/A 512Kb 320MHz
Maxtor DiamondMax VL20 20.4Gb UltraATA/66 Integrated EIDE	IBM Deskstar 34GXP 20.5Gb UltraATA/66 Integrated EIDE	Quantum Fireball Plus LM 20.5Gb UltraATA/66 Integrated EIDE	IBM Deskstar 34GXP 20.5Gb UltraATA/66 Integrated EIDE
2S, 1P, 1G, 2USB 2-btn 1-wheel PS/2 Packard Bell 5133 Internet-ready PS/2	2S, 1P, 1G, 2USB Logitech 2-btn 1-wheel cordless Logitech iTouch cordless PS/2	2S, 1P, 1G, 2USB Logitech 2-btn 1-wheel cordless Logitech iTouch cordless PS/2	2S, 1P, 1G, 2USB 2-btn 1-wheel PS/2 Mitsubishi Diamond Touch 104-key PS/2
Leadtek WinFast 3D S320 II nVidia TNT2 Pro 128-bit AGP 2X 32Mb 2,048 x 1,536 x 65K @ 75Hz Direct3D, OpenGL	Leadtek WinFast GeForce 256 nVidia GeForce 256 128-bit AGP 4X 32Mb 2,048 x 1,536 x 262K @ 60Hz Direct3D, OpenGL	Leadtek WinFast GeForce 256 nVidia GeForce 256 128-bit AGP 4X 32Mb 2,048 x 1,536 x 262K @ 60Hz Direct3D, OpenGL	Asus AGP-V6800 Deluxe nVidia GeForce 256 128-bit AGP 4X 32Mb DDR 2,048 x 1,536 x 262K @ 60Hz Direct3D, OpenGL
Packard Bell A720 0.27 17 15.9 1,280 x 1,024 x 60	LG Flatron 795FT Plus 0.24 17 16 1,600 x 1,200 x 75	Sony MultiScan CPD-E200 0.24 17 16 1,600 x 1,200 x 60	Mitsubishi Diamond View 1770F 0.27 17 16 1,280 x 1,024 x 75
Windows 98 NAV, Works 2000, Packard Bell utilities, Translator, PC- Doctor Windows 32, Encarta 99, PhotoExpress, VideoStudio, see review for details	Windows 98 Lotus SmartSuite 97, Norton AntiVirus, DVD Magic, Bitware for Windows	Windows 98 Nero Burning ROM, Lotus Smart Suite Millennium, Leadtek DVD Magic, Africa: The Serengeti, Encyclopedia Electronica, Learning Company Bodyworks	Windows 98 Asus DVD player, Rollcage, Ulead VideoStudio SE, Games Power pack, Drakan
Samsung 8x N Aztech PCI 288-Q3D Diamond Audio N/A 2 EAX MDP3858SP-WE 56K internal Philips CD-R/W Microphone	Matsushita (Panasonic) 6x N Creative SoundBlaster Live! Value Emcom MS330 N/A 2.1 EAX Netcomm 56K internal N/A N/A	Pioneer 16x N Creative SoundBlaster Live! Value Altec-Lansing Powerplay Plus ACS56 35W (satellite)/35W (sub) 4.1 EAX N/A AOpen CD-R/W CD-R/W media	Creative Labs 8x N Creative SoundBlaster Live! Value Creative Cambridge SoundWorks FPS 1000 4 x 3.5w (satellite)/1 x 10w (sub) 4.1 EAX N/A Castlewood Orb 5.7Gb drive 3D glasses, Orb 5.7Gb media

Performance measurements

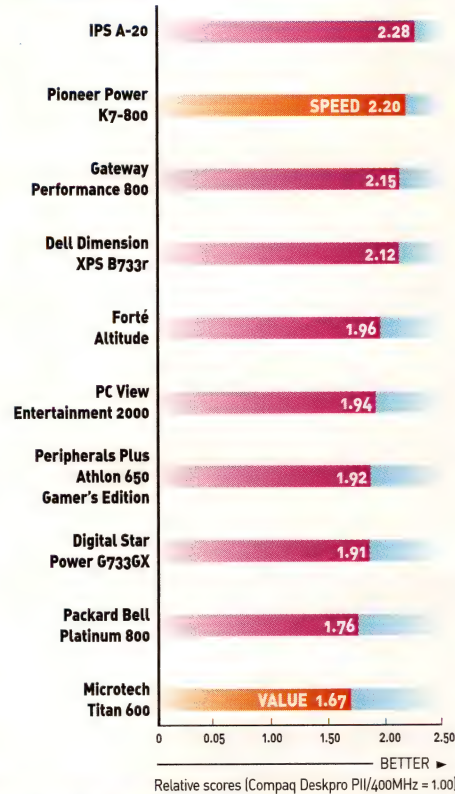
GRAPHICS



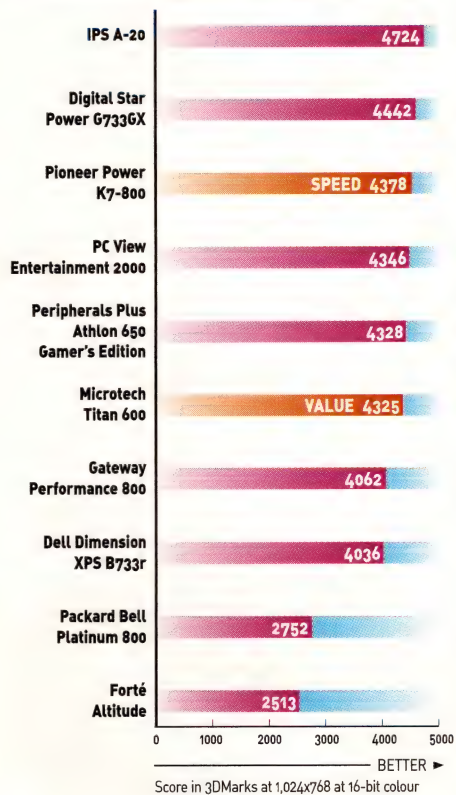
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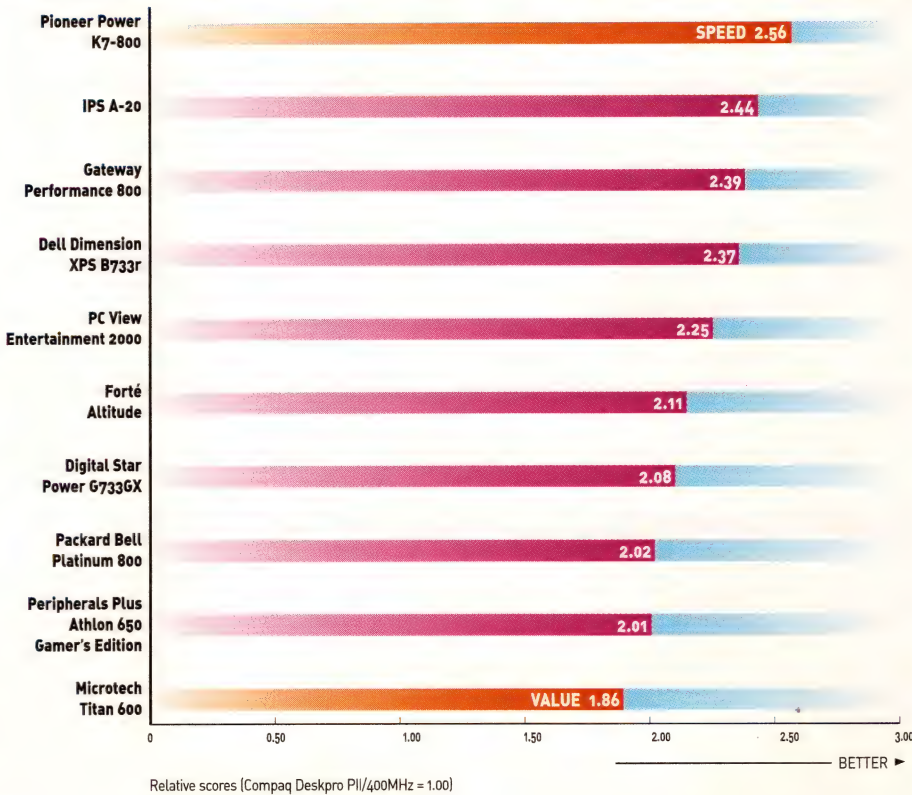
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3DMARK2000 PRO



OVERALL 2D APPLICATIONS



The Best R&D!

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Dual BIOS™

2 RIMM

3 DIMM

GA-6CXB7
Intel 820 Chipset

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Overdrive Utility
Overdrive your CPU speed
under Windows 95/98 environment.



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Intel® Pentium® III, Socket 370 **Dual BIOS STR** **GA-6CXC7 Intel® 820 Chipset**



- Supports Socket 370 & other compatible processors
- Supports Auto/100/110*/120*/133/140*/150* MHz FSB
- **4 DIMMs** up to 1GB SDRAM
- Provides one **AGP Pro** slot and one AMR slot
- Creative CT5880 PCI sound
- Supports **4 USB** ports
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- Includes DualBIOS™ technology
- Supports ACPI & STR (Suspend-To-RAM)
- Supports USB device wake-up
- H/W monitoring & Intel® LDCM® utility
- PC99 connectors
- Optional ISA slot

*Another model is also available: GA-6CXC7-1

All specification are same as GA-6CXC7 except with 3 DIMM, AC97 PCI sound, 2 USB ports, and w/o DualBIOS

Ultimate and Professional 3D Graphics!

GA-GF2560 NVIDIA Geforce256



- NVIDIA Geforce256, 256-bit 2D/3D graphics processor
- Industry's first GPU with integration of transform and lighting engine
- UltraSharp of 350MHz Palette-DAC
- Ultra-fast of onboard 32MB SDRAM
- AGP 4X with Fast Writes
- Motion compensation for full speed DVD playback
- Free Games and VCD player included
- Optional TV out feature support



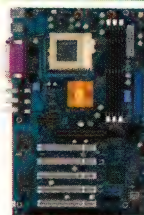
World Class Software Bundle!!!
Includes **Norton Utilities 2000 SE**
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Intel® Pentium® III, Socket 370 **GA-6VX7-4X VIA Apollo Pro Family**



- Supports Socket 370 and other compatible processors
- Auto/66/75*/83*/100/112*/124*/133/140*/150* MHz FSB
- **3 DIMMs** up to 1.5GB SDRAM
- Provides **AGP 4X** slot
- AC97 audio & AMR slot
- Supports **4 USB** ports
- Supports Ultra ATA 33/66 IDE device
- Supports ACPI & STR (Suspend-To-RAM)
- H/W monitoring & PC99 connectors
- Creative CT5880 PCI sound (optional)
- 3Com 930 LAN (optional)

Intel® Pentium® III, Socket 370 **GA-6VX7-1394 VIA Apollo Pro Family**



- Supports Socket 370 & other compatible processors
- Supports Auto/100/110*/120*/133/140*/150* MHz FSB
- **3 DIMMs** up to 1.5GB SDRAM
- Provides one **AGP 4X** slot and one AMR slot
- Supports **3 IEEE 1394** ports & **4 USB** ports
- Supports Ultra ATA 33/66 IDE device
- Supports ACPI & STR (Suspend-To-RAM)
- H/W monitoring & PC99 connectors
- Bundle MGI Software (VideoWave III SE)



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Dell Dimension XPS B733r

Verdict A hefty award-winning system carried over from our March Labs with a revamped speaker system.

Price \$4,999 (special)

Supplier Dell Computer 1300 303 275

Internet www.dell.com.au

Those who follow *PC Authority* will be familiar with the Dell Dimension XPS B733r, which in basically the same configuration won our Speed Award in a canter back in the March issue (p 52). It now takes a back seat to the more powerful CPUs that have arrived on the scene over the last three months - not that the months have been unkind to this Dell model. It still has what it takes to compete in its current company.

Some alterations have been made that will make it more appealing for this Labs' target audience. The modem has been dispensed with, and in its place is a hardware DVD decoder card. Instead of the Hitachi eight-speed DVD-ROM drive is a quicker NEC 12-speed drive. The crowning achievement though is the addition of the Altec-Lansing ADA885 speakers.

These speakers, at time of writing, are reputedly the only THX-compliant speakers for a multimedia PC in existence. The significance of the THX label is that the speakers comply with the standard that was devised by Lucasfilm for showing the original Star Wars movies so that it is aurally accurate to the original. Applied to a room as well as individual components only something like 300 cinemas around the world have the THX compliance label. It is understood Dell has an exclusive deal with Altec-Lansing to supply these speakers so canny readers will not be able to source them without first having to buy a Dell PC.

In spite of the commotion over the speakers we found the ADA885 lacked some mid-range coverage. At high volume the satellites distorted significantly. At lower volume the surround sound from the speakers was a treat, as was the versatility. The system allowed stereo, Dolby Prologic and Dolby Digital options to suit the room, soundtrack or your own taste. DVD movie viewing quality was good on the 19in monitor although action sequences and the booms and pops of action games might be better served by more direct speakers.

Apart from these changes to the bundle the only other difference to the system seen in March is a re-vamped software package. Time has been kind to the B733r, which still ranks as a fine PC with some nifty home entertainment options. Interested readers might also like to know that Dell is prepared to offer this system with this configuration only to *PC Authority* readers at our quoted price.

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Digital Star Power G733GX

Verdict An anomalous system. The specifications read impressively but actual performance is down.

Price \$3,899

Supplier Digital Star Computers 1800 800 628

Internet www.digitalstar.com.au

We expected big things from this system when it came in with the 733MHz Pentium III - one of the fastest CPUs in the lineup - powering this system, but were ultimately disappointed by its tardy performance. The probable cause is the Gigabyte motherboard, which uses the 820 chipset with the MTH memory translation chip using the cheaper and more readily available SDRAM instead of the RDRAM that is normally supported by the 820 chipset. Previous testing performed by the *PC Authority* Labs shows a definite inclination for systems basing their core logic on the 820 with MTH to behave slower than would normally be the case.

Other appointments for the Power P733GX, while not particularly exciting, were adequate, tried-and-trusted quality components. The Seagate hard disk is a value line product, while the Philips monitor has a 17in diagonal but will only produce a maximum of 1,024 x 768 pixels, which would be the bare minimum for those applications like some games, which are best at higher resolutions.

The Leadtek WinFast AGP card, using the nVidia GeForce 256 GPU, appears the current flavour of the month in performance graphics. In some respects the GeForce is wasted on this system, with a monitor that does not do justice to the card's capabilities. Not so the audio subsystem, however, which harnesses the Sound Blaster Live! Value card with the Altec-Lansing ACS54 speakers.

In general we found the ACS54 an excellent combination. The sleek black styling is one point to consider but their performance is better than several of the more expensive and higher-rated speaker combinations seen here. When spaced correctly the four satellites and modest sub-woofer output the richest sound, surpassed only by the Cambridge FPS1000 speakers that came with the Pioneer Computers Power K7-800. Games came to life with deep roars in artillery and piercing small arms fire. Audio CD playback was good and action sequences from DVD movie playback presented no problems. Video synchronisation was flawless, even without a decoder card, as you would expect from a 733MHz processor.

Readers might be put off by the low rating for this system, yet although the main thing it suffers from is a lack of features (in what has generally been a feature-rich Labs) the PC is a sound piece of equipment at a reasonable price.

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Forté Altitude

Verdict In the context of this Labs, some nice touches and system highlights for a mid-range system.

Price \$3,900

Supplier Forté Computers 1300 368 922

Internet www.fortecomputers.com.au



As with all of the PCs that came into the Labs this month there was a lot to like about the way the Forté Altitude functioned and presented itself. The first thing that struck us when we were setting up the system was Forté's choice of the Microsoft Intellimouse Explorer. The contoured design fits nicely in the hand and the red LED inside the mouse body glows strongly. Perfect for a darkened room viewing DVD movies!

The Hitachi 19in monitor was a good choice, exhibiting excellent definition from its 0.22mm dot pitch, and a high resolution and refresh. Matched to the Matrox G400 DualHead AGP card it was a winning combination. The choice of the DualHead card was also interesting, allowing users the option of dual monitor display for an extended desktop traversing both monitors or two separate monitors displaying the same scene - ideal for presentation purposes. There was also a handy TV-out option on the card for display to an external device.

Unfortunately, in the context of this Labs, the 600MHz Pentium III mounted on the Asus motherboard, though giving excellent account of itself, condemned the Altitude to the middle reaches of our performance benchmarks. The main tests in 2D saw the Altitude perform credibly, however the 3DMark2000 Pro scores saw the Altitude take out the wooden spoon. It wasn't that the G400 is a poor performer; more that the card has been supplanted by some of the newer cards that have appeared on the market since the G400 debuted.

In practical terms the relatively slow CPU made no difference. The playback of DVD movies was not interrupted by any visible lag in frame rates or any difficulties with synchronisation between audio and video. Best of all the Xitel Storm Platinum sound card, based on the Aureal Vortex II sound chip, greatly enhanced the audio experience. Documentation and utility software for the card was sparse, but matched to the Altec-Lansing ACS54 speakers they gave one of the fattest sounds to grace our ears. The surround sound qualities of the A3D-compliant card and speakers impressed greatly. The effect is probably best used in a gaming or movie playback role than for music listening.

The Forté Altitude is an attractive package that delivers a bang in excess of some of the more pricey systems in this Labs. Some extra application software would have improved its value rating dramatically.

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

Sound advice

Before we start there is one assertion that needs to be made.

Although most of these systems offer better than average speakers, with sub-woofers and satellites, some even with four speaker setups, it would be a brave move for anyone considering bringing the computer into the lounge room and making it part of the TV/hi-fi setup, even if the PC system supports the same surround sound technologies used in hi-fi systems. But for computer games, definitely.

When deciding on what sound system you want in your new PC, look at the sound card and the speakers. Most of the PCs in this roundup have Sound Blaster Live! cards of one type or another. These are all excellent cards, even the Value edition. The SB Live! Platinum is really aimed at more serious audiophiles and musicians, so unless you fall into this category go with the cheaper card. Those non-Sound Blaster systems tend to be cheaper chipsets built into the motherboard. But even these are adequate for most people. Serious gamers would do better to get a proper card though.

As with conventional hi-fi systems, speakers are very important for producing good quality sound in games and multimedia. Unless you only want the PC producing dings and beeps in the office you need decent speakers.

Anything that comes with just a stereo pair - you can forget about. This includes the Diamond set used on the Packard Bell PC. They may look nice mounted on the monitor, but they just don't compare in sound quality to any of the other speakers reviewed here.

What anyone remotely thinking about a home entertainment system needs, and what most vendors offer, is a sub-woofer with at least two satellite speakers. Ideally the sub-woofer will have the power supply built-in, and be a decent size to produce those low rumbling sounds that give games and movies depth. With the satellites, generally, the smaller the better. Small speakers produce crisper, more clearly defined high frequencies, and this also aids in stereo definition. There may get a bit of a 'hole' in the mid-range sound area but this is better than too much mid-range which makes things sound muddy and undefined.

Sub-woofers are designed to be placed on the floor, ideally under the desk and out of sight. Because of this you don't want your main controls to be on the woofer, as some systems like the CFS BookPC with its Thunder 910 speakers do. Controls on one of the satellites is best.

As you will have noticed most of the computers here use Altec Lansing, or Boston Acoustics speakers. Both these companies are well known for producing high quality hi-fi speaker systems, and their multimedia speakers are no different. Like most things, the more you pay the better the speakers tend to be although the THX-compliant ADA885 found on the Dell Dimension were not nearly as good as one might have hoped, distorting badly with even moderate sound levels.

Best among those we tested were the Cambridge Soundworks FPS 1000 supplied with the Pioneer Power PC; and the Altec Lansing ACS models supplied with the Microtech Titan, Peripherals Plus and Forté Altitude systems, the 56 and 54 models in particular.

Philip Moore



Gateway

Performance 800

Verdict Neatly presented package, well-optioned peripheral and software offerings.

Price \$4,999

Supplier Gateway 1800 500 338

Internet www.au.gateway.com



Gateway's reputation for bringing good value consumer level solutions meant we anticipated its entry would be a good one and, with some small concerns, we were not disappointed.

The concern that struck us was the old technology found inside the box, chiefly the BX chipset on the motherboard. The BX is tried and trusted technology that might be mature and stable but offers restrictions on the processor path if you intend a CPU upgrade; a 100MHz FSB instead of the 133MHz or 200MHz alternatives, and integrated UltraATA/33 disk transfer speeds instead of the latest UltraATA/66. Of course, if you don't care about the technology of tomorrow then the assessment is that the Performance 800 runs better than average as an entertainment platform for today. It passed muster in our performance benchmarks, scoring very respectably and consistently across all 2D tests, gaining third place overall.

Like the Dell Dimension though it dipped below average when it came to the 3D tests. The GeForce 256 card is unbranded, again like the Dell, but otherwise the specifications are identical to the other GeForce cards seen this month. There was provision for TV-out and a DVI interface on the card allowing the option to output to another display device. The monitor provided is a top notch 17in Gateway-branded model using a Trinitron tube.

DVD movie viewing was excellent on the monitor and displayed on the TV with equal aplomb. The Boston Acoustics speakers, which are a special OEM model for Gateway, delivered good bass but the higher frequencies were less dynamically represented. A 4.1 solution would be more appropriate for the quality of this machine. As it stands though the two satellite/one sub-woofer arrangement is adequate, but lacks surround sound characteristics.

A nice software bundle is included which rolls in a number of popular games titles and Microsoft Works for basic office productivity. The mouse and keyboard does not vary from other Gateway desktop models that we've seen. Where jazzy cordless mice and multimedia keyboards are all the rage Gateway has stuck by its standard offerings.

The Performance 800 might be expensive for the technology on offer but the presentation is top-notch and will not discourage novice users.

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



IPS

A-20

Verdict An extremely quick, powerful machine with some cosmetic enhancements.

Price \$4,290

Supplier IPS Intelligent Printing Systems (02) 9923 1777

Internet www.ipspty.com.au



IPS has put together some pretty nifty hardware for us in days gone by and we have to say it has not misplaced this belief, delivering a monster of a system for us this month. The most striking thing is an obvious cosmetic measure: the case sports translucent colour panels, dark blue in this instance, and a carry handle recessed into the top panel. The jury is still out on whether these measures are a serious attempt at making the slab-sided traditional PC more attractive or a tongue-in-cheek stab at the iMac.

Apart from the case our look under the hood revealed the highest rated processor in the Labs, an Athlon running at 900MHz. The motherboard was the latest from Tyan using the highly-rated VIA KX133 chipset. IPS advised us that the only version of the board that they had available to them came with a Crystal Semiconductor sound chip on board; by the time this issue hits the newsstands, however, a version will be available without the integrated sound.

The graphics adapter used is the popular Leadtek WinFast GeForce256 with 32Mb of DDR memory on board, also used by several other vendors in this Labs. Output is to the Philips 107s 17in monitor, which has modest display properties.

Viewing was adequate on this display and we had had no difficulties in playing DVD movie titles, either visually or aurally. The Genius speakers were quite powerful, delivering a total 40 watts of power. Unfortunately there was one noticeable flaw with their design and that was the controls sited on the sub-woofer. Subs are non-directional and work best tucked out of sight or in a corner where natural resonance can occur. Making adjustments to the speakers under the desk is not the most convenient arrangement.

Our benchmarks really show this system in its best light. The A-20 churned through the 2D tests, consistently topping the chart over the Pioneer Power K7-800, which we expected. Curiously though, the 2D graphics score was substantially down. As a result, the A-20 was pipped at the post for the Speed Award. It was no fluke result as we ran the tests a second time, just to make sure, but got the same result.

If you're interested in a quick PC platform with few frills then the IPS A-20 fits that category admirably, most likely as a serious games machine. In the context of this Labs the lack of entertainment-specific options told against it, however.

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

Variations on a theme

The *PC Authority* Labs is always at pains to meticulously test and document our findings on PCs that come into the Labs. Our Labs awards are not simply given out or raffled - there is logic and reason behind every decision which the magazine makes.

So when the Labs staff were in discussion about the winners, it was with some trepidation that we concluded that none of the candidates in this month's Labs would make it as replacements to conventional home

entertainment systems. Otherwise the iMac - with its distinctive coloured panels, all-in-one design, internal 56K modem and the DV extras like the slot-loading DVD-ROM drive and Firewire interface for connecting to a similarly equipped digital camcorder - is, if not an appliance that looks in place in the lounge, then one that at least looks a lot less like a PC.

In terms of operation the iMac is adequate but not likely to turn heads as a home entertainment system. The screen is good but just too small for family viewing, yet the addition of the iSub sub-woofer is a great move. Not only do you get an eye-catching piece of furniture looking for all the world like an old

Van Der Graaf generator but the low-frequencies get a much-needed boost. The trouble is the iSub, like all sub-woofer speakers, is unidirectional and works best tucked away in a corner of the floor, so its impact as a conversation piece is diminished.

As a DVD movie playback device it is adequate, but there were occasions where the system had difficulty synchronising video and audio. Not so the CFS BookPC. Its main claims to fame is its NLX form factor, the 'pizza-box' shape and size of the system unit, and the TV out plug. There was no noticeable problem with the BookPC handling a DVD movie even though the system only came appointed with the Intel 810 chipset, not even the improved 810e variety, and a Celeron 533MHz CPU.

It is a PC in all respects but the small footprint means it can reside in the hutch nested in with the VCR and CD player without drawing too much attention. What to do with the keyboard and mouse is another question. Another problem which precluded it from assessment with the other machines in our lineup was that the 3DMark2000 Pro benchmarks refused to complete, preferring to hang the system. With a higher feature set - including a wireless keyboard and mouse, better speakers and improved motherboard with CPU support - you have just about the closest thing to a PC-based home entertainment system that would fit into the lounge setting.

iMac DV SE

Price iMac DV SE: \$2,995

iSub: \$349

CPU: 400MHz PowerPC G3

RAM: 128Mb PC100 SDRAM

Bus Speed: 100MHz

Hard Disk: 13Gb

Display: 15in (13.8in viewable)

Graphics: ATI Rage 128 VR w/ 8Mb frame buffer and AGP 2x support

Features: Built-in 56K modem, Ethernet port, quad-speed DVD-ROM drive, iSub, software bundle includes iMovie editing application and Adobe Premiere, World Book Encyclopedia.

CFS BookPC

Price: \$2,395

CPU: Celeron 533MHz

RAM: 128Mb

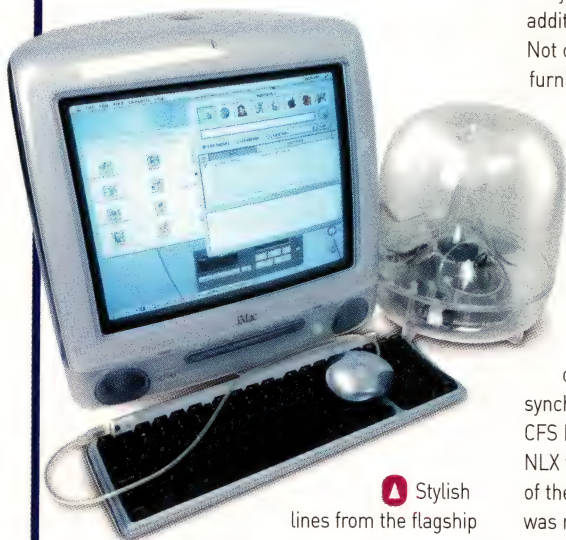
Bus Speed: 100MHz

Hard Disk: 13Gb

Display: 17in LG Studioworks 775N (15.9in viewable)

Graphics: Integrated 82180 GMCH w/ 4Mb frame buffer and DirectAGP support

Features: Integrated networking, 56K modem and sound, Thunder 3-piece speaker system (30 watt output), software bundle includes Lotus SmartSuite Millennium Edition and Encyclopedia Britannica CD2000.

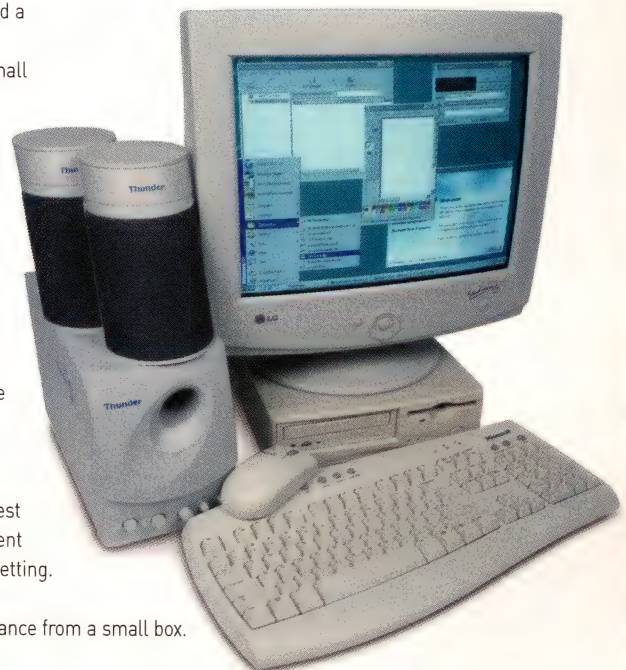


▲ Stylish lines from the flagship of the iMac range.

entertainment systems. Not that they couldn't do the job, but we're talking about a PC, which is from the outset a piece of office equipment being used as an instrument of leisure - not the other way around. And the average PC is hardly on par design-wise with a well built stereo system or cunningly crafted TV! Bring that beige thing into the lounge? Perish the thought!

Yet the most likely computers to make it into the sanctity of the family lounge are not what you would expect to see in this Labs, and more to the point, they break out of the tradition of what constitutes a personal computer without defying the constraint that they behave first and foremost as a computer. We speak of the Apple's iMac DV and the CFS BookPC, both machines configured well below our \$5,000 price ceiling, installed with 128Mb RAM, yet equipped with CPUs below our required minimum of 600MHz clock frequency.

The iMac failed comparison because it uses its own operating system, the celebrated



▶ Big performance from a small box.



Microtech

Titan 600

Verdict Low on power but have a look at the extras - everything but the kitchen sink.

Price \$4,999

Supplier MicroTech Corporation (02) 9648 1818

Internet www.microtech8.com



It was hard to believe anyone could cram so much into the \$5,000 price ceiling that we had set. If you look at our feature table you will notice the entry 'See review' in the 'Other' category, simply because we had no room to list all the extra goodies.

Our main concern was the 600MHz Pentium III CPU, which was the bare minimum specified in our invitation. It turned out to be the lowest processor in the lineup and as a consequence managed the wooden spoon in our performance benchmarks. This was not a problem for the tasks we subjected all the systems to; where there could be difficulties is when the other components like scanner and camera are sent into action.

For the record some of the tardy performance can be attributed to the MicroStar motherboard, which is another example of a product bearing the Intel 820 chipset hamstrung by the MTH memory translation chip, allowing it to use SDRAM instead of the RDRAM which is native to the i820 chipset.

The 19in NEC monitor is one of the company's value line of products although it boasted a stylish chassis, short tube, high resolution and refresh. DVD movie playback was adequate with no noticeable frames dropped or problems synchronising video and audio. The Sound Blaster Live! Platinum is Creative Labs' premium sound card. It came with the striking Live! Drive II, a panel filling an external drive bay and offers extra digital I/O, microphone and line in, and headphone jacks. Output is through an Altec-Lansing ACS45.1 speaker system consisting of a sub-woofer and two satellites, whose sound quality was not as good as other speakers. It gave a rather scratchy sound, which might be due to the TV/FM tuner card - these are notorious for imparting bus 'noise'.

Where the Titan 600 gained the most acclaim was in the extra goodies that would not normally be associated with a single PC purchase. Components such as the tuner cards have already been mentioned. Then there is the hardware DVD decoder, Epson Stylus Color 670 inkjet printer, Saitek flight controller, Canon FB630U scanner, Creative WebCam Go and even a network card and AMR modem. MicroTech has put together an ultimate bundle which still leaves us shaking our heads, and handing it the Value Award this month.

PC AUTHORITY	
PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Packard Bell

Platinum 800

Verdict One of the slowest machines inspite of one of the heftier processors but a knockout software bundle.

Price \$4,999

Supplier Packard Bell (02) 9313 3000

Internet www.packardbell.com.au



Packard Bell has earned a reputation for aggressive marketing and pricing and the Platinum 800 is straight out of this mould. Although it is one of the slowest machines this month according to the PC Authority benchmarks it boasted one of the fastest processors in the shape of an 800MHz Pentium III.

The hard disk is a value line drive from Maxtor, PC100 SDRAM is used instead of the quicker PC133 memory, the Leadtek WinFast S320 AGP card lacks some of the performance of the higher rated TNT2-based cards, while Aztech's PCI288 sound card is not as highly rated as the Sound Blaster range found in most of the other systems this month, and the Diamond Audio multimedia speakers sound reasonable for their model but lack the depth associated with the systems that come with sub-woofers. On the upside the Platinum 800 should be commended for the inclusion of the Philips CD-RW drive in addition to the DVD-ROM drive, which we made mandatory for entering in this Labs, the internal 56K modem, and the ample room for expansion in storage devices and spare slots.

The main claim to value for the Platinum 800, however, as for most Packard Bell models, is the fabulous array of software included in the box and hot-loaded onto the hard disk. You will notice the feature table on page 50 has the entry 'See review' in the software category. The reason for this is simply because there was insufficient space in the table. The offerings bundled with the Platinum 800 include Norton AntiVirus, Microsoft Works 2000, Packard Bell utilities, Babylon Translator, PC-Doctor Windows 32, Microsoft Encarta 99, Ulead PhotoExpress, Ulead VideoStudio, ACDSee, Alpha Centauri, Monaco Grand Prix, Baldur's Gate, Disney's Tarzan Action Game, Disney's Magic Artist, Phone Tools 2000, Netscape Communicator 4.5, Cyber Patrol, Net2Phone WinAmp, ICQ99, CU-See Me, Intel Web Outfitter and Nero Burning ROM. In addition there is a Recovery Boot Disk and CD for fool-proofing any catastrophic system crash. Quite a mouthful.

Packard Bell's prominence through retailers like Harvey Norman should see many Platinum 800 systems going into Australian homes. It is not cheap, but the beauty of this deal is that there is enough attraction in the extra goodies including the first three months warranty on-site for the Platinum 800's target market to overlook any shortcomings.

PC AUTHORITY	
PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



PC View

Entertainment 2000

Verdict A fast Athlon machine that gave the Value Award a shake by virtue of its knockout low price.

Price \$3,190

Supplier PC View (02) 9966 0066

Internet www.pcview.com.au



Readers taking a minimalist approach to an entertainment system should be interested in the Entertainment 2000 system submitted by PC View this month.

The choice of components for the most part reflects current trends seen over the last few months in the quality system market, starting with the 700MHz Athlon CPU. The benchmark tests found the Entertainment 2000 no slouch when it came to performance. It ranked fourth overall in the face of competition from some 800MHz and 900MHz systems and left some higher featured systems like the Digital Star and Packard Bell machines in its wake.

IBM and Leadtek provided the hard disk and AGP card respectively, proving a popular choice in this Labs with the IPS A-20 also following this formula. Sound is provided by the Sound Blaster Live! Value card, another favourite this month. We were less than impressed with the Emcom speakers, which gave some rattly distortion, used bare ends instead of plugs for connecting the satellites with the sub-woofer, and had the controls placed on the sub instead of the satellites, making it awkward to adjust if the sub is sited in an out of the way location.

The monitor PC View has used is one of the Labs staffers' favourites - the LG Flatron. The months since its first appearance in the Labs has not dimmed our enthusiasm for its crystal clarity and precise geometry. DVD movies played back well on the flat screen and the output to TV was also solid with no evidence of frames dropped or audio out of synch with the video.

Another feature that comes out of our 'preferred by Labs staffers' cupboard is the use of the Logitech cordless mouse and keyboard. The mouse is different to the one looked at in our December 1999 issue (*issue 25, p112*) but the principle remains the same. A receptor plugging into the PS/2 slots for mouse and keyboard allows you to control the show from across the room, whether you are in direct sight of the receptor or not - great news if you are thinking of bringing the PC into the lounge but find the captive mouse and keyboard cables a chore.

Deliberations over the Value Award included discussion over the merits of the Entertainment 2000. There is no denying the attraction of this machine for its low price but in the context of this Labs a value rating based on price is an oxymoron.

PC AUTHORITY	
PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Peripherals Plus

Athlon 650 Gamer's Edition

Verdict One of the value contenders, with a thoughtful system configuration but inconsistent performance results.

Price \$3,995

Supplier Peripherals Plus (02) 9630 3166

Internet www.perplus.com.au



Peripherals Plus has been one of the darlings of the Labs, coinciding with its embrace of the AMD Athlon CPU as the company's chip of choice. Peripherals Plus also has the happy knack of delivering systems that fit into the context of the Labs topic for any given month.

This occasion though sees it just missing the mark.

As the name suggests, an Athlon CPU running at 650MHz was fitted to the M7 Pro motherboard. In this Labs it was a lightweight offering, which still gave a reasonable account of itself in the performance benchmarks, particularly in the 3D tests where the Leadtek WinFast GeForce256, a popular choice amongst this month's Labs entrants, gave a good account of itself.

The rest of the system was impeccably presented, as expected from Peripherals Plus. We were impressed with the use of the same Logitech cordless mouse and keyboard as seen with the PC View Entertainment 2000 machine. For anyone contemplating a dabble in marrying the PC to the lounge room TV a cordless mouse and keyboard is a must.

Completing the hardware appointments were a CD rewritable drive, which should prove a popular option amongst home users thinking about mixing and mastering CDs, the popular Sound Blaster Live! Value sound card, a Sony monitor that ranks alongside the Gateway and PC View displays for quality, and an excellent set of Altec-Lansing ACS56 speakers. These speakers closely resemble the ACS54 model bundled with two of the systems this month but boast a slightly larger sub-woofer. The effect is the same, with the addition of booming bass tones and crisp trebles. When the four satellites are sited correctly the surround effect is awesome. Altec-Lansing recommends this kit for games environments but we could not fault them when we were viewing DVDs or playing CD music.

Lastly, the software bundle provided by Peripherals Plus is modest but classy. Unlike some of the contenders Peripherals Plus has included some DVD titles to make best use of the drive. In most of our Labs the machine configured here would have walked away with an award but even with the impressive three year on-site warranty there is nought to show other than an honourable mention.

PC AUTHORITY	
PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

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CE-56PBK	SO20093	STYLUS Colour 400/500/600/Photo Black	\$17.00
CE-57CL	SO20097	STYLUS Colour 200/500 3-Colour	\$23.00
CE-58BK	SO20108	STYLUS Colour 800/850/1520 Black	\$17.00
CE-59CL	SO20089	STYLUS Colour 400/600/800/1520 3-Colour	\$23.00
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EPSON Stylus Colour /PRO/XL	3x4	16-CLR
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Hits and misses

Rather - Hits and Hits. This Labs was feature-rich so rather than focus on good points and bad points we take a step back and show you some of the goodies that can go into a PC with an entertainment flavour.



1 Saitek flight controller

The two parts sit alongside each other and simulate cockpit controls. Both modules have a comfortable grip and feel and there are more than enough buttons for all your needs.

2 Harman-Kardon iSub

Striking piece of equipment that plugs into an iMac via a USB port. The pity is for best effect a sub-woofer needs to be sited in a corner or on the floor where you can't show it off!

3 ACT Labs GS-PC1

Arcade shooters will feel more comfortable with these pistols and controls. The difficulty is that controlling game play is done with a control stick in one hand while the shooting is done with the pistol in the other hand. Awkward to use.

4 Canon CanoScan FB630U

One of the scanners that figured in the Labs of January 2000 (page 75). A bare A4 page footprint, low-profile and no power supply as the scanner draws its power through the USB port make this an attractive add-on.

5 Creative WebCam Go

Reviewed in our March issue (page 94) this is a way-cool accessory that has a million applications other than simply taking photos.

6 Asus 3D glasses

Bundled with the Asus AGP-V6800 Deluxe card. Not the best of its kind but a nice add-on to go with certain games supporting the genre.

7 Creative microphone

A standard appointment when it comes to multimedia systems. Gamers would have a tendency for one of the headsets currently available.



Pioneer Power K7-800



Verdict A speed demon unleashed once again.

Price \$4,999

Supplier Pioneer Computers (02) 9690 2888

Internet www.pioneercomputers.com.au



In this Labs we were expecting to see some hot technology as multimedia is one of the main driving forces in the industry; in general all companies supplied top of the line equipment. It seems Pioneer has found the right mix of components, again, to take the Speed Award.

Even though the Power K7-800 was judged the fastest overall, the IPS A-20 did manage to beat it in all but the 2D graphics application testing. It also seems this machine was rushed through the production process, as we found several little problems with this system that should have been picked up by Quality Control.

From the outside the Power K7-800 looks like a standard PC; it's not until the case is open that a few little features are shown. The inclusion of diagnostic LEDs on the motherboard is a fantastic idea - Dell has been using these for some time now. On the down side for this system, the LEDs are located next to the parallel port, facing in toward the CPU, which means the case must be opened for anyone to actually see them. Dell has the LEDs mounted on the case so they can be seen from the back of the system without having to open the machine. One of the little problems mentioned earlier was noticed when the case was first opened - the 3.5in drive mounting bay being only held in by a single spring loaded clip. The drive bay wasn't screwed back into place after the drives were mounted, which could lead to damage in shipping or use.

One stipulation we have with these systems is that they must be presented to us as they would when sold to an end user, with all components installed, all manuals included and all software installed. Unfortunately the software DVD player wasn't installed on this machine, which is frustrating for a new user.

Highlights for this machine include the best speaker system encountered in this Labs, the excellent Cambridge Four Point Surround (FPS) 1000, the Asus AGP card with the 3D glasses, and the brand new Orb drive with a 5.7Gb capacity. The Cambridge speakers might look fragile but pack quite a wallop, with the richest sound when spacing the satellites correctly while the Orb drive opens up opportunities for mastering multimedia productions.

As far as performance goes this system only just beat the IPS-A20 system due to its superior graphics test score, but we add the caveat that though this system may be fast, it does have a few problems.

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

The Winners

We've had some curly choices to make over the years but the competition this month has made choosing just two winners a particularly tough challenge.

PC Authority Labs Award for Speed

Machine Pioneer Power K7-800 **Supplier** Pioneer Computers (02) 9690 2888 **Price** \$4,999



For a fully-fledged PC to survive as a multimedia powerhouse you need processing grunt. The PC Authority Benchmarks determined that the Pioneer Power got across the line in first place, not that it had its own way. For most of the tests the IPS A-20 headed the Pioneer by virtue of its 900MHz Athlon processor, as opposed to the 800MHz Athlon in the Pioneer. It was only the graphical component of the tests, using Photoshop and Corel, that the IPS faltered, dropping to the middle

of the field and eventually falling by the wayside in the overall analysis.

To paraphrase the saying, computers do not live by speed alone, and the Pioneer Power K7-800 comes with a modest assortment of entertainment software titles. Added to this is the hardware extras in the form of the nifty Asus 3D glasses, our favourite speaker combination for this Labs in the Cambridge FPS for the fattest sound sensation produced in the Labs, and the excellent Orb drive with the performance and capacity for audio-visual work in a removable form factor.



PC Authority Labs Award for Value

Machine MicroTech Titan 600 **Supplier** MicroTech Corporation (02) 9648 1818 **Price** \$4,999



The race for the Value Award was a close run thing, so close that there was serious concern whether to make it a joint award. Ultimately we plumped for the Titan 600 from MicroTech over the Peripherals Plus and Dell PCs, and when you look at the specification, it is easy to see

why. The sheer weight of goodies including the scanner,

printer, Web camera, TV and radio tuner and Live! Drive II is simply mind-blowing.

The subject matter covered is not conducive to traditional 'value' so we did not emphasise price, although the major concern we have with the Titan is its lack of performance. In the end it became a toss-up and the question we asked ourselves was which system had the most features you would want yourself if you had \$5,000 to spend? The Titan simply had too many things we liked, which in the end won the day.



Honourable mentions

Honestly, with the lineup this month we could have had two award winners and eight honourable mentions, but we have a particular affection for the Dell Dimension XPS B733r. If we were to give a Quality Award this month then Dell would probably make it on the basis of it producing the most balanced and consistent PC. Special mentions are also deserved for the software bundle that go with the Packard Bell Platinum 800; the value for money of the PC View Entertainment 2000; and the dual display capabilities of the Forté Altitude.

Parting shots

There are two conclusions that can be drawn from this Labs. Firstly, there's a lot of computer you can buy for \$5,000 - the Microtech Titan is the extreme example of this - and secondly, the PC has a long way to go before making it as a converged appliance in the family living room - although you can see where the concept of the home entertainment system is heading. While the PC vendors are looking at the likes of the white goods manufacturers, ultimately the challenge for the home entertainment market space could come down to a decision over the expanded capabilities of the new generation of console devices - the Dreamcast, Playstation 2 and its successors.

Next Month



We take another step into the high-end for our July issue with a look at graphics workstations. Techno-toys with little relevance to the mainstream user, or the highest digital lifeform? Come with us as we have a peek under the hood of what may well be the platform the next *Matrix* or *Toy Story* is created on.

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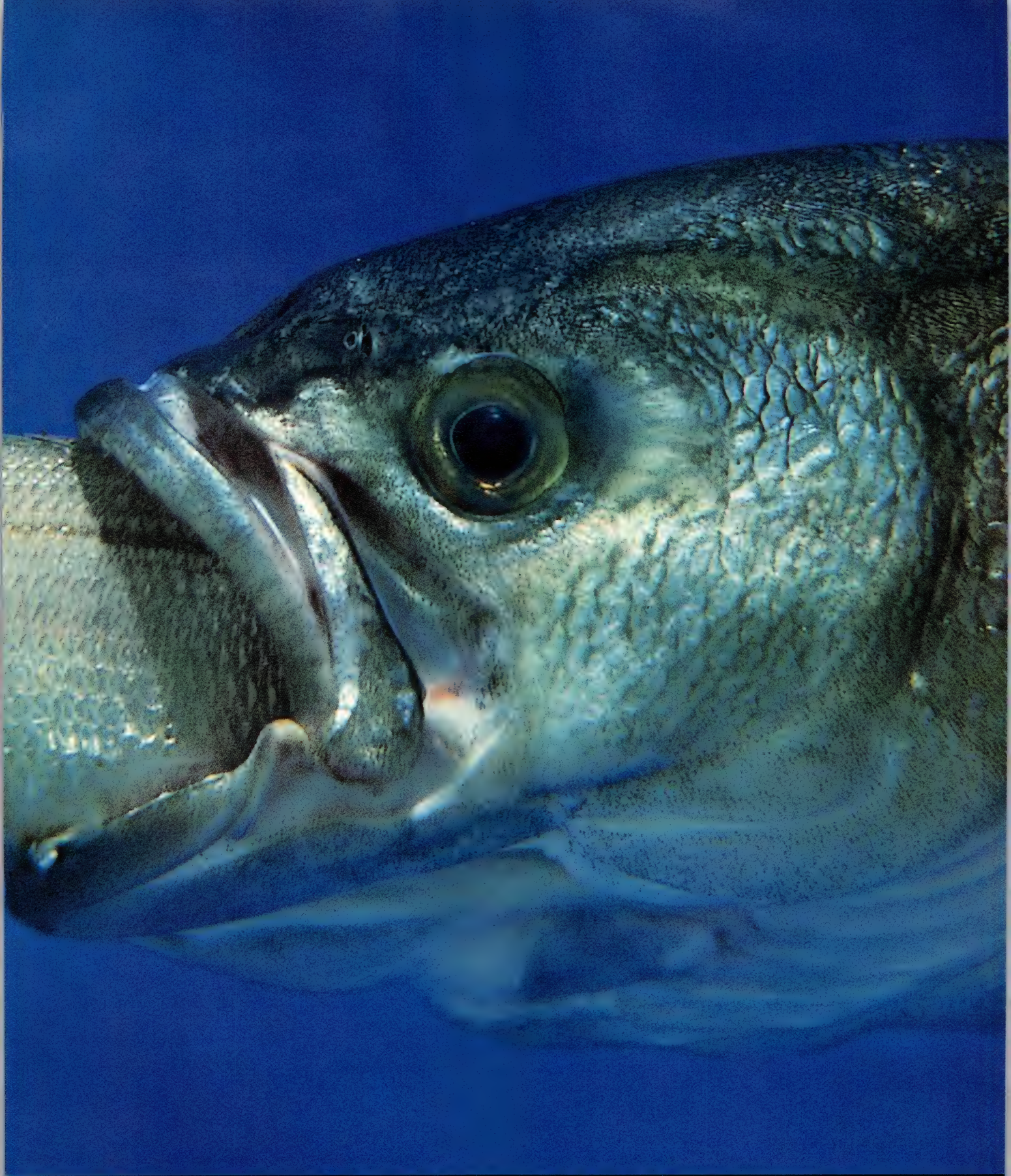


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LABS 2

Palmtop Paradise

While PDAs began their life as the same kind of techno-curiosities that mobile phones once were, their popularity is now rocketing.



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In researching this Labs it struck us that nothing could be further from the truth than a generic label such as personal digital assistant. Personal? We had the Labs staff take the units and use them as they should be used - eating, sleeping, and travelling with them - and the consensus is that there's nothing personal about them. And we're not saying they need a junky, fluoro plastic panel or two to say 'this is me'; no, rather we're talking about doing what we want with them, to have them work the way we want them to as individuals.

Handheld computers? Well, take a look at some of the latest mobile communication devices. We are just scratching the surface when you consider the functionality built into some of the more fanciful creations from the likes of Philips, Nokia, Ericsson and Motorola. They boast some of the most sophisticated programmable digital logic, yet ask anyone on the street and they'll tell you it's a phone and a computer is something that sits on a desk.

The close relationship between communication-centric handheld devices and data-centric handheld devices is no coincidence though, and the distinction will become further diversified and blurred as time marches on.

We've taken a look at eleven devices for this Labs feature. To qualify they had to be handheld (obviously), with an operating system to match. No other qualification needed to be spelt out. Keyboards, sound, colour displays and expansion capabilities were optional. No awards for guessing the traditional *PC Authority* Benchmarks are totally inapplicable here considering the marked diversity in OSes.

Along the way we've also put the IBM Microdrive reviewed in *PC Authority* last month (page 97) to practical use, as well as a LAN card from 3Com in a CF form factor. There's also a look at two Windows CE tablet devices: handheld but bulkier than most PDAs.

For anyone who has ever found themselves on a street corner cursing the lack of their desktop computer, take the time to look at our appraisal of the latest and coolest toys in computing.

Labs Editor David Lin

Contributors Tim Dean, Valens Quinn, Simon Tsang, Stephen Teh, Justine Stewart-Crompton



Specifications & features

Manufacturer and model name	Compaq Aero 1520	Ericsson MC218	IBM Workpad 3c	Palm IIIc	Palm IIIe	Palm Vx
				QUALITY		
▷ Price (including tax)	\$699	\$1,299	\$799	\$899	\$349	\$799
▷ Credit card surcharge	N/A	N/A	N/A	N/A	N/A	N/A
▷ Shipping charges	N/A	N/A	N/A	N/A	N/A	N/A
▷ Supplier	Compaq Computers	Ericsson Australia	IBM Australia	Palm Inc	Palm Inc	Palm Inc
▷ Phone	13 23 93	1300 650 250	13 24 26	1300 360 558	1300 360 558	1300 360 558
▷ Internet	www.compaq.com.au	www.ericsson-mobiles.com.au	www.ibm.com.au	www.palm.com.au	www.palm.com.au	www.palm.com.au
▷ Warranty	1 year	1 year	1 year	1 year	1 year	1 year
BASIC SPECIFICATIONS						
▷ CPU	NEC MIPS R4000	ARM710T	Motorola DragonBall E2	Motorola DragonBall EZ	Motorola DragonBall EZ	Motorola DragonBall EZ
▷ Frequency	70MHz	36MHz	20MHz	20MHz	20MHz	16MHz
▷ ROM	16Mb	12Mb	8Mb	2Mb	2Mb	2Mb
▷ RAM	16Mb	16Mb	8Mb	8Mb	2Mb	8Mb
▷ Height x Width X Depth (mm)	12.5 x 79 x 130	23 x 170 x 90	11 x 79 x 115	15 x 80 x 128	18 x 81 x 120	10 x 77 x 115
▷ Weight incl. Batteries (g)	140	354	119	185	170	115
▷ Display type	STN	Mono LCD	Mono LCD	Colour TFT	Advanced Mono LCD	Advanced Mono LCD
▷ Display resolution W x H (pixels)	240 x 320	640 x 240	160 x 160	160 x 160	160 x 160	160 x 160
▷ Display dimensions W x H (mm)	61 x 81	134 x 50	51 x 51	57 x 57	57 x 57	57 x 57
▷ Memory gauge	Y	Y	Y	Y	Y	Y
▷ Password protection	Y	Y	Y	Y	Y	Y
▷ Pointing device	Stylus	Stylus	Stylus	Stylus	Stylus	Stylus
DATA ENTRY						
▷ Data entry method	Stylus	Keyboard and stylus	Stylus	Stylus	Stylus	Stylus
▷ Number of keys on keyboard	N/A	53	N/A	N/A	N/A	N/A
▷ Numberpad layout	N/A	Y	N/A	N/A	N/A	N/A
▷ Handwriting recognition software	N/A	N/A	Graffiti	Graffiti	Graffiti	Graffiti
▷ Audio input	Y	Y	N	N	N	N
BATTERIES						
▷ Batteries required	Integrated Li-ion	2 x AA	Integrated Li-ion	Integrated Li-ion	2 x AAA	Integrated Li-ion
▷ Backup battery	Y	Y	N	N	N/A	N/A
▷ Manufacturer's quoted battery life	7 hours	1 month	2 weeks	2 weeks	2 months	1 month
▷ Battery status monitor	Y	Y	Y	Y	Y	Y
SOFTWARE SUPPLIED						
▷ Word processor	N	Y	N	N	N	N
▷ Spelling checker	N	Y	N	N	N	N
▷ Custom dictionary	N	Y	N	N	N	N
▷ Spreadsheet	N	Y	N	N	Y	N
▷ Diary/ scheduler	Y	Y	Y	Y	Y	Y
▷ To-do list	Y	Y	Y	Y	Y	Y
▷ Contacts	Y	Y	Y	Y	Y	Y
▷ Notepad	Y	Y	Y	Y	Y	Y
▷ Drawing	Y	Y	N	N	N	N
▷ Finance	Y	N	N	N	N	N
▷ Calculator	Y	Y	Y	Y	Y	Y
▷ Online help	N	N	N	N	N	N
▷ Email	Y	Y	Y	Y	Y	Y
▷ Stopwatch	N	N	N	N	N	N
▷ Daily alarms	Y	Y	Y	Y	N	Y
▷ World time	Y	Y	Y	Y	N	Y
▷ File manager	Y	Y	N	N	N	N
▷ Games supplied	Solitaire	Bombs	N	Gammon	N	N
▷ Operating system	Windows CE 2.11	EPOC 5.0	Palm OS 3.5	Palm OS 3.5	Palm OS 3.1	Palm OS 3.5
▷ Programming language included/available	Y	Y	Y	Y	Y	Y
COMMUNICATIONS						
▷ PC connectivity supplied	Y	Y	Y	Y	Y	Y
▷ Docking station	Y	Y	Y	Y	Y	Y
▷ Infrared port	Y	Y	Y	Y	Y	Y
▷ PC Card support	N	N	N	N	N	N
▷ CF support	Y	Y	N	N	N	N
▷ USB support	N	N	N	N	N	N
▷ Connect to modem	N	Y (via IR)	N	Y	N (Available in US and UK)	Y
▷ Connect to phone	N	Y (via IR)	N	Y	N	Y
▷ PC software supplied	ActiveSync 3.0, Sierra Imaging, QuikView CE, Audible Manager, Pocket Asset Manager, CF Backup/Restore	PsiWin 2.31	DB2 Everywhere, EasySync, Mobile Connect, Mobile NetConnect	HotSync	HotSync	HotSync
▷ Other software supplied	N	Web browser, Postcard	Expense Calculator	Expense calculator	Expense calculator	Expense calculator
▷ Data synchronisation	Y	Y	Y	Y	Y	Y
▷ Connect to printer	N	Y (via IR)	N	N	N	N
▷ Upgrade options	CF memory, fax modem, 24Mb RAM module, Deluxe cradle	N/A	Flash ROM	Flash ROM	N	Flash ROM

How we tested



The traditional benchmarking that *PC Authority* conducts on PCs in the Labs is impossible when it comes to evaluating the PDAs on test this month. The devices ranged widely in terms of

operating systems, applications, features and functionality. Furthermore, while they all fall under the heading of Personal Digital Assistant, each of them had different emphases, and were targeted at slightly different segments of the portable market. Thus, each of the Labs staff was given one or more of the PDAs to use for a period of no less than two weeks. They were encouraged to use it as much as they could, as they would their own PDA. In other words we put them to real world usage. All the Labs staff then gathered to assess the devices and share their experiences of the products under their charge.

Size and weight

Portability is a big factor in anyone's selection of what will essentially be worn or carried by the user everywhere. A simple equation - less is better, but not at the cost of the other factors.

Ergonomics

It's not always the smallest or most powerful being the best. You might have the most portable computer on the planet but you still have to want to use it. We looked at the way the product was designed, who it was designed for and the way a user interacts with it. Typical criticisms would be regarding the screen size, data entry method (keyboard layout or handwriting recognition algorithm), comfort of use and other observations the user had interacting with the product.

Applications

The big question before any other questions are asked is whether the product has the applications you want to run. All PDAs have a core set of functions like a calendar, appointments, notepad, and address book. We looked at their features and how well they integrated, as well as the availability of third party apps. Extra applications outside of the core were also taken into account.

Build quality

A small but relevant category. Due to their portable nature, PDAs need to be tough enough to handle day to day wear and tear. We also commented on the sturdiness of the designs and whether there were any glaring design flaws.

Connectivity

All of these devices interact in some way with a host PC machine. This category looked at not only the range of options but also the efficiency in setting up the connection and how accurately the handheld synchronised with the desktop.

	Pision 5mx	Psion Revo	Psion Series 7	Royal daVinci	Sharp HC7000
				VALUE	
	\$1,095 Depends on dealer Depends on dealer Vodafone [02] 9415 7777 www.vodafone.com.au 1 year	\$795 Depends on dealer Depends on dealer Vodafone [02] 9415 7777 www.vodafone.com.au 1 year	\$1,995 Depends on dealer Depends on dealer Vodafone [02] 9415 7777 www.vodafone.com.au 1 year	\$299 N/A N/A Smart Products [02] 9791 3155 www.smartproducts.com.au 1 year	\$2,795 N/A N/A Sharp Australia [02] 9830 4600 www.sharp.net.au 1 year
	ARM710T 36MHz 10Mb 16Mb 23 x 170 x 90 354 Mono LCD 640 x 240 133 x 50 Y Y Stylus	ARM710T 36MHz 8Mb 8Mb 18 x 157 x 79 200 Mono LCD 480 x 160 125 x 48 Y Y Stylus	Intel StrongARM SA1100 132MHz 16Mb 16Mb 38 x 234 x 180 1148 Colour STN 640 x 480 157 x 116 Y Y Stylus	Motorola DragonBall N/S 2Mb 2Mb 18 x 87 x 127 170 Colour LCD 160 x 160 55 x 63 Y Y Stylus	Toshiba MIPS TX3922 129MHz 48Mb 32Mb 28 x 213 x 140 790 Colour TFT 800 x 480 155 x 95 Y Y Stylus
	Keyboard and stylus 53 Y N/A Y	Keyboard and Stylus 53 Y N/A N	Keyboard and stylus 58 Y N/A Y	Stylus N/A N/A daVinci Script N	Keyboard or Stylus 75 Y N/A Y
	2 x AAA N/A 1 month Y	Integrated Ni-MH N/A 14 hours Y	Integrated Li-ion Y 8.5 hours Y	2 x AAA N/A 5 weeks N	Integrated Li-ion N 10 hours Y
	Y Y Y Y Y Y Y Y Y Y N Y N Y N Y Y Y Bombs EPOC 1.05 [254] Y	Y N N Y Y Y Y Y Y N N Y N Y N Y Y Y Cascade EPOC 1.06 [320] Y	Y Y Y Y Y Y Y Y Y Y N Y N Y Y Y Y Bombs EPOC 1.05 [254] Y	N N N N Y Y Y Y Y N N Y N N N Y N N daVinci OS Y	Y Y Y Y Y Y Y Y Y Y N Y N Y Y Y Y Solitaire Windows CE 2.11 Y
	Y N Y N Y N Y (via IR) Y (via IR) PsiWin 2.31	Y Y Y N N Y (via IR) Y (via IR) PsiWin 2.31	Y N Y Y N Y Y PsiWin 2.31	Y Y N N N N N CompanionLink SmartSync	Y N Y Y Y Y N ActiveSync 3.1
	Web browser	Web browser	Web browser	Expense manager	Pocket IE, Sharp MPEG-4 Camera, Movie Player, Movie Gallery, PC File Viewer, MP3 Player
	Y Y (via IR) CF RAM	Y Y (via IR) N/A	Y Y (via IR) Up to 20Mb CF RAM, Docking station	Y N Flash ROM	Y N N/A

Size matters

From the pocketable to the luggable, we put this month's lineup side by side to give you a sense of scale.



▲ IBM WorkPad 3c



▲ Royal daVinci



▲ Palm Vx



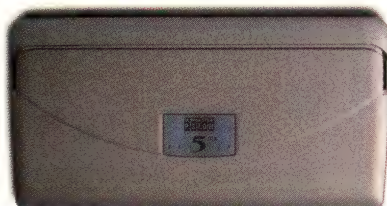
▲ Palm IIIc



▲ Palm IIIe



▲ Compaq Aero 1520



▲ Psion 5mx



▲ Psion Revo



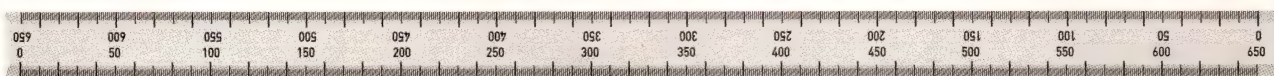
▲ Ericsson MC218



▲ Sharp HC7000



▲ Psion Series 7





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Pioneer 2000 SOHO PC

Celeron 500	\$1690
Celeron 533	\$1790
Pentium III 600:	\$1890
Pentium III 650:	\$1990

Supermicro SBA BX M/B
64 M PC100 RAM
13.6 GB HDD IDE
Creative Nvidia TNT2 16M AGP
Creative Vibra 128 sound card
Macase ATX GLOSSY Midi Tower
480W SPEAKER,
MITSUBISHI 40X CDROM, 1.44M FDD
MITSUBISHI 15" Monitor
MITSUBISHI K/B, Mouse, Win 98,

Pioneer 2000 POWER PC

Pentium III 650:	\$2770
Pentium III 733:	\$2990
AMD K7 750:	\$2890
AMD K7 850:	\$3290

Supermicro PIII/SCD 820 M/B(K7-MSI)
128 M PC100/133 RAM
20 GB HDD IDE 7200 RPM
MATROX G400 32M AGP DAUL HEAD
Creative SB LIVE value digital card
Macase ATX GLOSSY Midi Tower
600W SubWoofer SPEAKER
10X DVD IDE DRIVE, 1.44M FDD
MITSUBISHI 17" Monitor
MITSUBISHI K/B, Mouse, Win 98,

Pioneer 2000 SERVER

Pentium III 600:	\$2830
Pentium III 650:	\$2940
Pentium III 700:	\$3120
Pentium III 800:	\$3790

Supermicro SBU 2940U2W BX M/B
128 M ECC PC100 RAM
IBM 9.1GB SCSI LVD HD
Diamond A55 8M AGP VGA
"40X SCSI CD ROM, 1.44 FDD"
Macase ATX Full Tower
INTEL 10/100M NETWORK CARD
MITSUBISHI 15" Monitor
MITSUBISHI K/B, Mouse,
OPTIONAL: WIN NT SERVER V4

Pioneer 2000 Slimbook

SlimSoho Celeron 466:	\$2650
SlimPower Pentium III 500:	\$4130

SlimSoho: 12.1" TFT, Only 1.9 KG
32M RAM, 6 GB Ultra DMA HD
SlimPower: 14.1" TFT, Only 2.5 KG
64M RAM, 12GB Ultra DMA HD
All with:
24 X CD Rom, 4M VGA
3D Audio Stereo System
56k Modem and 1xType II PCMCIA
MS Windows 98 CD

Pioneer 2000 Sohobook

Celeron 500:	\$2690
Pentium III 600:	\$2990
Pentium III 700:	\$3190

32M SDRAM
6Gb Ultra DMA HD
4M 128 Bit ATI Graphic
24 X CD Rom
12.1" TFT LCD
3D Audio Stereo System
Microphone & Speaker
MS Windows 98 CD
UPGRADE TO: 64M RAM +\$99
14.1" TFT: +\$690, 56K MODEM: +\$125

Pioneer 2000 Powerbook

Pentium III 600:	\$4290
Pentium III 650:	\$4390
Pentium III 750:	\$4890

64 M SDRAM
12 GB Ultra DMA HD
8M 128 Bit Graphic
6X DVD Drive
14.1" TFT LCD 1024X768
3D Audio Stereo System
Microphone & Speaker
1 Type III / 2 Type II PCMCIA
MS Windows 98 CD



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Compaq

Aero 1520

Verdict A slim wisp of a PDA that doubles as a dictaphone. Or was it a dictaphone that doubles as a PDA?

Price \$699

Supplier Compaq Computers 13 23 93

Internet www.compaq.com.au



A minimalist approach has been taken by Compaq with this personal digital assistant. Measuring not much wider and a few centimetres taller than a cigarette pack, its brushed aluminium shell makes the Aero 1520 one of the more elegant pocket accessories seen this month.

The implementation of CE Compaq has used is sparse, in keeping with the size of the Aero. With no keyboard available for the Aero 1520 everything is pointed and clicked with the heavy stylus supplied. No handwriting recognition makes it difficult to envisage anyone using a conventional PC application, however. Instead Compaq plays on the advantage in size and shape that the Aero 1520 affords by bundling some useful applications and hardware functionality.

The software package that comes with CE includes the usual Outlook suite like Inbox, Contacts, Calendar and Tasks. There is also a calculator, voice recorder, the Solitaire game and Notetaker, which allows freehand text-writing and scribbling. In addition to these are third-party applications which can be downloaded from the host PC. These consist of Compaq's Qmenu, File Explorer, Picture Viewer and Asset Viewer; Audible Player and Audible Manager, which allow special audio files downloaded from a Web site to playback, Pocket Asset Manager, Quick View Plus (file viewer), VCA Finance (expense tracker) and a 30-day trial of Image Expert CE which is a utility to voice annotate documents.

There's 16Mb of RAM to play with and fill on the Aero 1520; memory upgrades are accommodated through a Type 1 CF slot recessed into the top of the unit. The Lithium Ion battery is removable. Recharging is strictly through the docking cradle, which has a classy, understated feel to it.

There are four easy access buttons for opening Calendar, Contacts, Tasks and Notetaker below the screen. Another three buttons on the left side allow voice recording control like a dictaphone. It works well but using it as a device to play back Wall Street stock prices and newspaper headlines in the car while travelling to and from work, as the promotional literature suggests, seems too far-fetched.

The Aero is a great PDA in the Palm tradition. The abbreviated CE interface takes some getting used to but word is that the latest iPaq gets around some of the interface problems which will make this lightweight a handier proposition.

PC AUTHORITY

QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Ericsson

MC218

Verdict A well-featured PDA based on the Psion 5mx with added Ericsson mobile connectivity.

Price \$1,299

Supplier Ericsson Australia 1300 650 250

Internet www.ericsson-mobiles.com.au



The Ericsson MC218 is essentially identical to the Psion 5mx, which is also reviewed in this Labs, although the MC218 is specifically intended for use with any of the 600, 700 or 800 series of Ericsson mobile phones. An Ericsson IR modem is included in the standard bundle, which allows you to get connected to the Internet or other communications sources right out of the box. Connectivity features are relatively easy to set up through the EPOC operating system, and the Web can be accessed through the basic Internet application that comes pre-loaded on the device. You can also send SMS messages and utilise WAP features through WML. Ericsson's My Phone program allows you to connect to your phone, upload and download contacts, edit settings, divert calls, and even program your own distinctive ring using a virtual keyboard, allowing for some stirring Philip Glass-style renditions.

In terms of PDA functionality, the MC218 shares all the strengths and weaknesses of the Psion 5mx. For users who would rather have a keyboard/stylus hybrid device instead of a stylus-only PDA, such as a Palm, then the MC218 is about the best compromise in terms of ergonomics and size. The keyboard is small, although the keys are a good size, and all standard keyboard functions are easily accessible. The keys are a little stiff, however, which makes touch typing a bit of a hit and miss affair. The stylus, which is stored in a spring-loaded port in the side of the device, is comfortable and easy to use.

The EPOC OS is one of the best PDA operating systems around, and there are plenty of applications available for it. Included in the MC218 is a good range of apps, including a decent word processor, basic spreadsheet, a calendar, and a contacts database as well as the Ericsson-specific My Phone application.

Performance is good, with an ARM 701T processor running at 36.9MHz powering the MC218, along with a big 12Mb ROM and 16Mb of RAM. There is also a CF slot for additional memory or devices. The monochrome LCD screen is clear and crisp and responds to the stylus quickly. Battery life is rated at 40 hours on a couple of AA cells, or around one month of usage, which is fairly reasonable.

At over a twelve hundred dollars, the MC218 is not a budget option, although if you intended to use it with your Ericsson mobile right away, then it is an excellent choice.

PC AUTHORITY

QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



IBM

WorkPad c3

Verdict Similar to the excellent Palm V in nearly every way except in colour and support for Lotus Notes.
Price \$799
Supplier IBM Australia 13 24 26
Internet www.ibm.com.au

In the already crowded PDA market, IBM's WorkPad c3 is pitched as an integral part of IBM's business solutions rather than a stand-alone device. Also, instead of trying to compete against current PDA operating systems or suffering the expense of developing one of its own, IBM has chosen to rebadge a proven market leader, the Palm V, from Palm Inc. The WorkPad has essentially all the same great features as the Palm V. Aesthetically, it has stylish lines and a lightweight casing but is black in colour compared with the Palm's original graphite. However, we felt that this surface may be easier to scratch than the Palm.

Loading the software onto the PC is easy and user-friendly; basically the same as that of the Palm OS but branded as IBM, including a virtual onscreen tour for the novice and Palm-uninitiated. The desktop interface is identical but also includes conduit software for Lotus Notes on CD.

Standard Palm applications are installed on the WorkPad. With Mail you can read and compose email on the road and then synchronise it with the mail program on your PC. Information from your current email address book can be imported into the WorkPad's address book with the included HotSync cradle. The earlier version of the WorkPad used to have the Notes client and connection software included in the bundle on a separate CD but it appears they have abandoned this practice. There are also some extra connectivity options offered on the CD. In all probability though due to the nature of IBM's marketing strategy with this product line, the Notes components will be included.

The Lithium Ion battery recharges while it is sitting in the cradle and provides plenty of charge for weeklong excursions away from a power point. Information may also be beamed between the PDA and a compatible notebook or mobile telephone via the infrared port. When connected, a simple press of the HotSync button will synchronise the data stored in your WorkPad with your PC.

The WorkPad c3 is a great choice of PDA for someone that already uses IBM hardware and/or Lotus software. Anyone who appreciates the design of the Palm V will enjoy using the WorkPad, and its minimal appearance belies its ability to be customised to the individual's very specific requirements and desires.

PC AUTHORITY	
QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Palm

IIIc



Verdict A class act. Bright, functional, portable and totally appealing.
Price \$899
Supplier Palm Inc 1300 360 558
Internet www.palm.com.au

The IIIc (reviewed issue 29, p98) is Palm's answer to the many Windows CE products in the market which were first to the podium with colour screens in a handheld PC. As its model designation implies, it is based on the III-series platform first introduced with the original Palm III, which was subsequently followed up by the IIIx and IIIe iterations. With a slightly stretched depth where the application launch buttons reside, the Palm IIIc is physically the largest Palm model available in Australia. It manages to hide its size very well, being entirely black, and considering that the colour display tends to detract from any shortfalls the PDA may have.

The screen is the same resolution as the rest of the Palm range, which is 160 x 160 - small by Windows CE (Pocket PC) standards. Also, at 256 colours, it doesn't measure up against competing Microsoft devices - or so it would appear. However, the IIIc stacks up better in practice than its specification implies as these limitations have all been subject to making the IIIc a useable handheld PC. Palm's primary considerations for the IIIc's design brief was battery life, size and weight. Fitting a rechargeable Lithium Ion battery to it takes care of the first issue and keeping the screen size down addresses the second and third.

The display is clear and bright, with the contrast adjustable via holding down the power switch, which brings up a sliding bar. However, it does tend to get washed out in bright sunlight, rendering the Palm IIIc difficult to use outdoors. The growing list of colour applications, games and utilities becoming available since the IIIc's release a couple of months ago, however, makes the colour screen an almost indispensable aspect of owning a handheld PC. Going back to a monochrome Palm after using the IIIc just seems a little dull.

While it may not have the same levels of built-in functionality as the current crop of Pocket PC devices, such as voice recording and MP3 playback, it's debatable how useful these features actually are with the high cost of memory today. The standard suite of applications supplied with the IIIc, though an improvement over previous models, is rather basic. All things considered though, the Palm IIIc is an exceptionally well-designed handheld PC and a balanced approach to the limited computing power of PDAs, making it a deserved Quality Award winner.

PC AUTHORITY	
QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

Vadem Clio C-1050 and Fujitsu PenCentra 130

Both the Vadem Clio and Fujitsu's PenCentra 130 are Windows CE-based, with relatively full feature sets, designed with portability and a pen-and-tablet interface in mind. They sport large colour screens, long battery life, PC Card support and are intended to be working machines primarily used as a tablet, that is, held in one arm and data entered or accessed via the pen stylus. They are both very different in style and approach but are examples of an enormous range of application specific handheld devices that play unseen parts in our everyday life. Many warehousing, field sales and POS systems depend on these powerhouses, often in tandem with a bar code reader attachment or wireless expansion card for communication with a host machine. The fact is that it is a part of their nature that the hardware and software is tailored for a specific use, locking them into a vertical market, so they are rolled out as part of a solution. Don't expect to see too many of these tablets floating around on retail store shelves - yet.

Vadem Clio C-1050

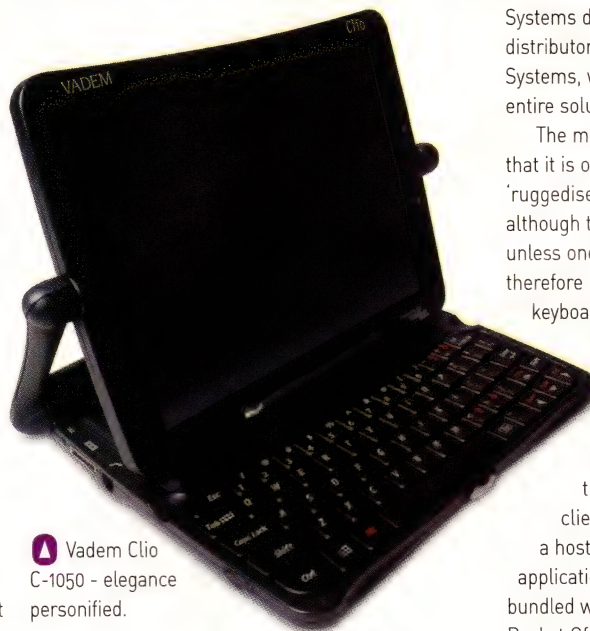
Price \$2,430

Supplier Advanced Portable Technologies
1300 300 213

Features 24Mb of ROM, 32Mb of RAM, 1.4kg, 640 x 480 pixel colour DSTN display, 10 hours battery life, CalliGrapher handwriting recognition, built-in keyboard, PC Card and CF card support, IR, bUseful utilities pack, integrated sound, 56K modem (not yet ACA approved).

The Clio is elegance personified. Its contoured shape and remarkable patented SwingTop allow it to sit comfortably in the crook of the arm as a tablet device. Simply flipping the screen reveals the keyboard giving you a computer resembling something seen on the desks of Star Trek captains. Tilt the screen again and you have a presentation device.

The screen is excellent for a passive matrix colour display. A full standard VGA 640 x 480 pixel resolution can be shown and the full CE application suite is included with the bUseful series of utilities. CalliGrapher handwriting recognition is useful, although it takes some getting used to.



A Vadem Clio C-1050 - elegance personified.

What the specifications do not describe is the quality of the Clio. It is beautifully crafted, has a low height and slips conveniently into a briefcase pouch, and the keyboard is just about as good as a full notebook PC.

Fujitsu PenCentra 130

Price \$3,387

Supplier Mobile Computer Systems
(02) 9967 4280

Features 24Mb of ROM, 48Mb of RAM, 0.9kg, 640 x 480 pixel colour DSTN display, 12 hours battery life, CIC Jot handwriting recognition, PC Card and USB support, bUseful utilities pack, Citrix ICA client software, Fujitsu CE utilities, integrated sound, docking station.

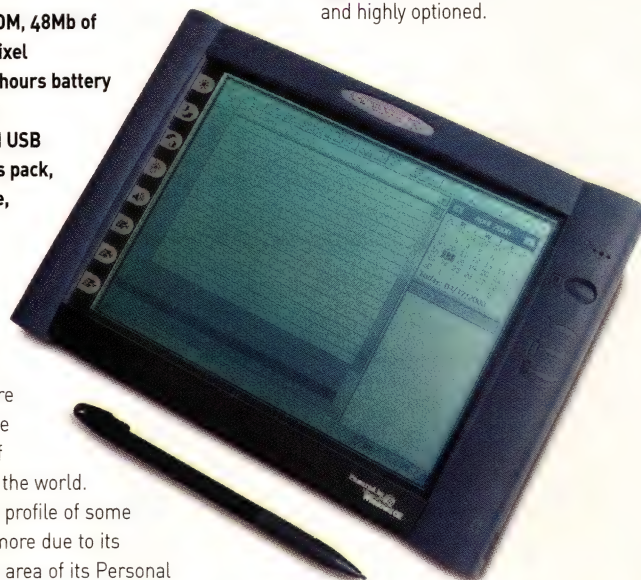
It came as something of a shock when we were told that Fujitsu was one of the main suppliers of handheld computers in the world. That it doesn't have the profile of some of the other players is more due to its business model for this area of its Personal

Systems division: Fujitsu works closely with its distributor, in this case Mobile Computer Systems, who usually sources and integrates an entire solution for its customers.

The main slant on the PenCentra 130 is that it is one of a class of handhelds that is 'ruggedised'. Rubber mounts absorb shock although there is no mechanical disk drive, unless one is used in a PC Card slot, and therefore no moving parts. There is no keyboard built in, and is primarily designed as a working machine in the field, and for tablet use, but a PS/2 port is provided.

Another indication of the work ethic of this machine is the inclusion of the Citrix thin client software for connectivity with a host machine and enterprise applications; the utility applications bundled with the usual CE goodies and Pocket Office; the choice of an indoor- or outdoor-use models, where the backlighting is curtailed for outdoor use. Backing this up is a complete range of accessories tailored for the mobile worker, like ruggedised carry bags, car cigarette lighter adapters, bar code readers and screen protectors. The PenCentra 130 is not a machine for everyone, but nor is it intended as one.

V Fujitsu PenCentra 130 - ruggedised and highly optioned.





Palm IIIe

Verdict The humblest of the Palm family in this Labs needs some stiffening to compete.

Price \$349

Supplier Palm Inc 1300 360 558

Internet www.palm.com.au



We had one of the special releases of this version of the Palm, which comes with a translucent plastic shell. Not that it made any difference to it feeling very, well, plastic in the hand.

With an asking price of \$349 Palm is banking on people not expecting too much from their Palm IIIe PDA. For the most part the IIIe faithfully constructs the Palm flavour - the applications are the same core offerings on every one of the Palm family. Address Book, Calculator, Calendar, Expense Calculator, HotSync, Mail, Memo Pad and To Do List are all standard fare.

There are four hot keys for activating the calendar, address book, to do list and memo pad and the rocker switch in the middle of the buttons for scrolling through menu choices. The 2Mb of RAM in this model limits the amount of data the Palm can hold, however. In a test transfer synchronising a Lotus Organizer 97 file holding nearly a decade's worth of appointments and contacts, the Palm transferred fields accurately but truncated without transferring the data entirely.

Nor can the lack of memory be alleviated by any expansion. The Palm IIIe memory is fixed, nor are there expansion slots of any description available. Another bugbear is the use of disposable AAA batteries instead of an integrated rechargeable cell for power. Initial purchase cost may be attractive but depending on your working patterns, a pair of batteries every few weeks adds to a sizeable running cost over a year.

The ROM is not flashable either; any interface with the outside world has to go through the connector to the host PC or Macintosh or via infrared. Normally this would involve Palm's universal HotSync process, with the Palm placed in its docking cradle and its synchronisation preferences set, but the growing number of options that plug into the HotSync interface like modems and cameras does not limit the IIIe model to a host computer only. Users thinking of making use of some of the gadgetry that can plug into the Palm might need to check first whether they overrun their memory resources.

Palm is pitching the IIIe at entry-level users like students. The limitations mentioned above will affect mature users who have existing data that they need to synchronise, but for anyone starting out there is hardly any better way to do it than with a Palm.

PC AUTHORITY

QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Palm Vx

Verdict A turbo-charged Palm V with all the design and usability features that has made the Palm the world's favourite PDA.

Price \$799

Supplier Palm Inc 1300 360 558

Internet www.palm.com.au



Although the two may look the same, think of the Palm Vx as the turbo-charged version of the popular Palm V. With a hefty 8Mb of storage - four times that of the Palm V and Palm IIIe, it's doubtful that you'll ever have to worry about running out of space for applications and data.

The Vx's sleek, anodised aluminium casing should suit executives types and the style-conscious, and is a definite step up from the plastic-clad Palm III models, which seem cheap by comparison. Despite the extra memory, the actual size of the Vx is the same as the V, and as such, is easy to store in a breast pocket.

The Palm Vx comes with the same HotSync cradle as the V and WorkPad models, and it also doubles as a charging station. The built-in Lithium Ion battery provides a good charge; we found that it ran quite happily for a week with frequent use before the charge level dropped to half.

Historically, the Palm platform has always excelled in ease of use, and the Palm OS version 3.5 that came installed with the Vx is no exception. It's still the pick of the crop when navigating the menus of Palm devices over the competition. The combination five-button/stylus-based handwriting recognition interface has proven its worth, both in terms of ease of use and versatility. If you don't like using the Graffiti handwriting recognition, you can opt to peck away at an onscreen keyboard and number pad instead.

The touch sensitive LCD display is easy to read, and you can switch to larger text if you have trouble. Reading an entire Ebook on the Palm didn't induce any eyestrain but the screen does pick up annoying glare in certain lighting conditions. The backlighting is subtle in daylight - you may not notice that it's on, but it works reasonably well in dim conditions. Text is still quite easy to read providing you're holding it at the right angle. Another minor niggle is the stylus fitting so snugly into its holder that it takes fingernail-breaking force to remove it. As standard, you get one metal stylus and a plastic replacement one.

In terms of price, the Palm Vx is less than the IIIc, which has the same amount of RAM but a colour screen. It's not overpriced, but unless you need to carry around loads of data or run some complex applications, you're probably best off with a 2Mb Palm V instead.

PC AUTHORITY

QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Psion

5mx

Verdict The bread and butter of the Psion range - well featured, easy to use and powerful.

Price \$1,095

Supplier Vodafone (02) 9415 7777

Internet www.vodafone.com.au



The Psion 5mx comes with an impressive array of hardware, incorporating an ARM710T 36MHz processor with 10Mb of ROM and 16Mb of expandable RAM and a CF card slot that allows the user to increase the RAM by up to 64Mb. Add to this an infrared port and the mobile executive is armed with an extremely powerful handheld device.

The 5mx comes with a monochrome screen, an intentional design decision to save on battery life, and it includes its award winning keyboard design. Smaller than a notebook, touch typing on this PDA, whilst a little cramped, is the closest you will get to any comparable notebook. Finally, a mouse is replaced by a ballpoint stylus which loads by means of a spring action within its own cradle.

The 5mx is driven by the Series 5 Symbian EPOC operating system, which by all accounts is a sturdy and efficient upgrade of its Series 3 predecessor. Combined with a bevy of standard software features such as Word, Sheet, Data, Contacts, Agenda, Jotter and Sketch we have quite a tidy little system.

The PsiWin 2.3 software which comes with the device allows what Psion calls 'seamless connectivity' between PC and PDA. Essentially, once connected to a PC via a serial cable the PsiWin software enables the user to access files from the PDA, recognising the Psion as another system folder. Once files are accessed from the Psion they are easily converted to their requisite function. The PsiWin software also allows the Psion to synchronise data flow between the PC and the PDA by tapping into your PC's Lotus Organiser 97 or Outlook 97/98 program.

Mobile executives can also take advantage of upgraded email, fax and Internet functions. Connections can be made via the device's infrared port to an infrared enabled mobile phone, mobile phones with PCMCIA card connectivity, or via the preferred method of the new Travel Modem, which uses infrared connectivity to the modem which is then linked to a telephone wall socket.

The Psion Series 5mx retails for around \$1,095, with the Travel Modem retailing at about \$499, and the non GSM version retailing for about \$399. In a world where mobility is becoming a must for the busy executive, and the lines between communications and information technology are fast becoming blurred, the Psion Series 5mx offers a compelling reason to palm off the competition.

PC AUTHORITY

QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Psion

Revo

Verdict A sleek and elegant lightweight PDA targeted at users without exacting needs.

Price \$795

Supplier Vodafone (02) 9415 7777

Internet www.vodafone.com.au



The Psion Revo is a compact and attractively styled PDA with a silver and blue black casing, a testimony to its European origins. Smaller, sleeker and lighter than its Series 5mx cousin it is ideal for placing in a top pocket, a handbag or even carrying it around in a pants pocket.

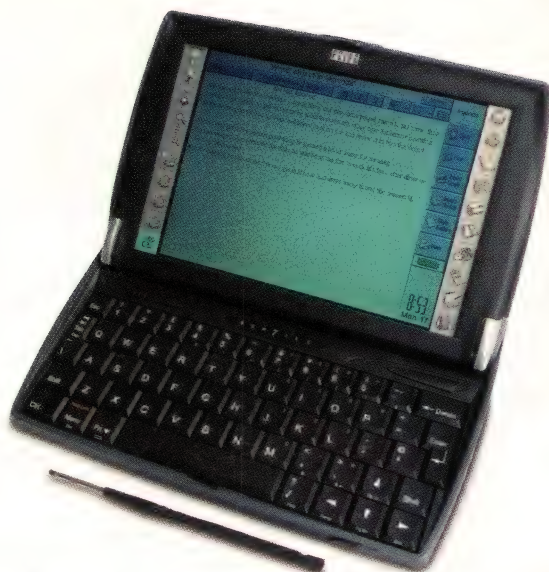
The Revo contains an ARM710T 36MHz processor with 8Mb of ROM and 8Mb of RAM. It has a usable Qwerty keyboard, although in this instance due to size restrictions the user cannot touch type. As with the 5mx it has an infrared port that enables the Revo to link up to an infrared enabled mobile phone, or to the infrared enabled Travel Modem. The Revo also has built in speakers, and a functional stylus pen for use on the touch screen display. One point of difference between the 5mx and the Revo is that the Revo comes with built-in rechargeable batteries which have approximately 14 hours of life or one week in normal usage terms. The batteries can be quick charged to 85 per cent capacity over one-and-a-half hours, and then the device will trickle charge a further four-and-a-half hours to bring it up to full charge. Furthermore, the Revo has no backlight function, which invariably conserves on power.

Just like its 5mx cousin the Psion Revo comes with an impressive suite of software. The EPOC operating system resides in ROM, and the same standard Word, Sheet, Data, Contacts, Agenda and Jotter applications are native to this device. PsiWin 2.3 software is used for synchronisation and file exchange between the Revo and your PC. Unlike the 5mx, the Revo comes with a docking cradle linked via a serial cable. Also missing from the 5mx is Phone Manager software, which allows the user to download the phone numbers from their mobile phone, make changes and then upload the altered details back into the phone. Printing may be done via the PC with the Revo placed in its docking station, or alternatively if you have a printer with an infrared port.

The Psion Revo sells at a competitive \$795. Palmed off executives or students will find the keyboard-enabled Revo a call from heaven. Some extra expansion capabilities would not go astray but otherwise the only other criticism leveled at the Revo is some compatibility issues with the PsiWin conduits and Windows. Otherwise it is a capable entry-level handheld computer that will repay your investment in no time.

PC AUTHORITY

QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



Psion Series 7

Verdict More a subnotebook-class computer than a PDA. The Rolls-Royce of Psions.

Price \$1,995

Supplier Vodafone (02) 9415 7777

Internet www.vodafone.com.au

In a departure from Psion's usual mantra of portability as well as functionality the new Series 7, which has just hit the streets, will make eyes turn. For a start it weighs more than a kilo, putting it in the subnotebook class a touch below the lightweight notebooks we saw in the Labs in the February 2000 issue. Handling the squat clamshell design is a delight as the case has been wrapped in a leather cover giving it a style lacking in any of the other handheld devices in this Labs.

The weight gain has been put to good use. A full VGA-strength 640 x 480 pixel display is accommodated on what is the best passive matrix colour screen we have seen. The keyboard is excellent for the size of the keys, as is their tactile response. An Intel RISC CPU running at 133MHz lies at the core of the Series 7 powered by an internal Lithium Ion rechargeable cell. 16Mb of RAM is available for storage as standard. This is expandable through either a CF card on one side of the case or a PC Card on the other.

Basic communication is still through a serial port located next to the CF card recess and dependent on a host system running Windows. The port will not allow communication with a modem. At time of writing Vodafone was still in the process of gaining local approval for the Psion Dacom IR modem.

Like its smaller brethren, the Revo and 5mx, the Series 7 uses PsiWin software to connect with the host. The installation CD also contains the Web browser, email synchronisation and Java plugins, manuals on OPL application development for the Psion range and a selection of trial software offerings.

All standard ROM applications appear on the Series 7 including word processing, spreadsheet, charting, calendar, database, contacts, jotter and email. There is also a drawing package called Sketch, allowing you to insert freehand drawings into your documents. On top of the applications, Psion also includes some sample files and a game called Bombs.

Vodafone sees the Psion Series 7 as an executive tool, where some heavy duty capabilities are rolled into the smallest form factor. At a touch under \$2,000 it will only interest well-heeled types, but for this premium there is some wonderfully integrated technology that will suit the discerning user.

PC AUTHORITY	
QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000



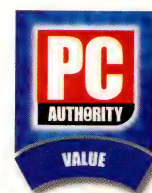
Royal daVinci

Verdict Limited functionality but a step-up from a basic electronic organiser at a low price.

Price \$299

Supplier Smart Products (02) 9791 3155

Internet www.smartproducts.com.au



Unsurprisingly the Royal daVinci gained our Value Award when the scaling was so heavily slanted towards a price point. The next nearest thing is the Palm Ille, which it managed to pip at the post in spite of the extra functionality afforded by the Palm. The heritage it shares with the Palm family is primarily in the underlying technology, where both share the same Motorola DragonBall-family processors. Power is likewise handled by two AAA batteries. Unlike the Palm Ille though the daVinci has a flashable ROM. We attempted an upgrade which was downloaded to the host PC and then downloaded to the PDA but it locked up.

Hardware user interface design differs little between Royal, which is a subsidiary of Olivetti, and the Palm Ille with 2Mb of storage memory for the user, a self-contained handwriting recognition engine (called daVinci Script versus Graffiti on the Palm family) and separate patches on the backlit mono LCD screen for entering alphabetic or numeric characters.

In the case of the daVinci all input and output is conducted through a host PC - there is no infrared port. The edge connector slots into a docking cradle that is linked to the host PC COM port. Royal provides an installation CD which holds the CompanionLink software for linking with the daVinci. It resembles Palm's interface where you set your preferences. We were disappointed with the lack of extra applications and third-party offerings on the CD.

In the basics of performance as a handheld PDA, though, the daVinci appears sparse although it does what it is designed to do with alacrity. The basic PDA applications are provided, like a contact database, to do list, calculator, world clock and notepad that allows both textual and graphical input. An email client would have been ideal but one isn't included. A remarkably good folding keyboard is available, however, as an optional accessory from Smart Products at around \$100; this will prove a popular add-on.

A word of warning for prospective buyers - the success of the Palm family has been maintained by ubiquitous third-party support. There is nowhere near the support for the daVinci OS that there is for its competing operating systems yet. The danger is that you could be landed with technology leading up a dead end.

PC AUTHORITY	
QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

And in the other hand...

A handheld computer only goes so far. What is the other hand holding then? Some of the considerations you might consider if you go down the PDA path are pretty obvious. Some, like bar code scanners for handheld devices, are becoming rather popular. Others are a little wackier, like Web cameras.

For Palm, daVinci and tablet devices like the Fujitsu PenCentra 130 (shown on page 74) the add-on that cries out is a keyboard. Palm has an officially endorsed keyboard that folds down in three stages to fit in a 93 x 130 x 20mm space and weighs 250g. It folds out to a full-sized QWERTY keyboard and is a truly marvelous piece of engineering. Simply plug it into the edge connector of a Palm and it works. The main trouble with the uptake of these is the \$199 asking price.

A more modest competitor to the Palm family is our Value Award winner for this month, the daVinci. It too relies on handwriting recognition and has an optional keyboard available for around \$100. The keyboard folds in two like a single slice of bread into a sandwich, and is about the same size when folded. Unfolded though it is considerably smaller than a full-sized keyboard, the keys are smaller, which makes touch typing more difficult, and its build is considerably flimsier.

Storage or RAM is always a matter of contention with handheld computers. Expansion through traditional solid state memory like Compact Flash has always been expensive. Typical memory increments might be only 5 or 10Mb. If you only have one slot in the PDA and still need more, too bad. Imagine the reaction when hardened users were offered the IBM Microdrive (reviewed issue 30, page 97) with 340Mb of storage. Just plug it in and the storage is there to be used.

Missing the convenience of the office network? Bandwidth a problem with a conventional modem or mobile phone when surfing the net? Why not hook onto the LAN with 3Com's \$195 Megahertz 10Mbit CF LAN card? Anyone with a Type 2 CF slot using Windows CE 2.1 or later can take this step. Like all network add-ons it has its idiosyncrasies but the basic steps are straightforward. You'll need a host PC, though, to load the drivers.



Some popular PDA add-ons.



Sharp HC7000

Verdict A classy PocketPC with loads of features, although you would have to be a kangaroo to pouch this.

Price \$2,795

Supplier Sharp Australia (02) 9830 4600

Internet www.sharp.net.au



The unit submitted by Sharp was a pre-production factory sample lacking retail packaging and documentation. Sharp assure us the full release product will not differ too much from what we have seen.

So what have we seen? Simply put, the HC7000 is stunning. Believe us when we say the Windows CE operating system never looked so good. Not only is the display colour but it's a glorious active matrix TFT panel with a resolution of 800 x 480 pixels, greater than the standard 640 x 480 VGA.

The most obvious difficulty in equating this product with the rest of the handhelds is the size. Any device measuring 213 x 140mm is hardly pocketable. At 790g in weight it's also a heavyweight. In the context of this Labs these vital statistics worked against the HC7000. The next most noticeable feature working against the HC7000, or the most dissuading feature depending on your disposition, is the \$2,795 price.

Both of these difficulties are understandable. The size and weight are a result of cramming functionality into the system. All these features and functionality come at a price - but you do get what you pay for. And what are you paying for? The clamshell opens up like a conventional notebook with a hinge, the top panel holding the screen and the bottom with a full, almost standard, notebook keyboard. Use the HC7000 as a conventional notebook or open it up as a tablet device. There is a Web camera in the hinge that can be controlled by buttons on the lid. It captures both stills and rather jerky video.

Connectivity options include a serial port, IR port, cable connection to a mobile phone, USB slot, Type 2 CF slot and a Type 2 PC Card slot. Our review model also had a jack for a built in modem but at time of writing telecommunications approval had still to be granted. On the software side the system has a full implementation of Windows CE 2.11, Pocket Office and Pocket Internet Explorer. In addition to the Microsoft offerings there are some specific programs commissioned by Sharp for mail, backup and operating the camera.

Sharp has raised the bar in handheld computing. It would be difficult to find another like device such is the uniqueness of the HC7000 but in the context of this Labs, it is just too big and too expensive to make any impression on our awards structure.

PC AUTHORITY

QUALITY	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

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April 2000

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64X Record
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MP7063A

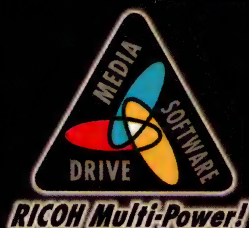
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ReWrite
32X Read



MP7080A



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The Winners

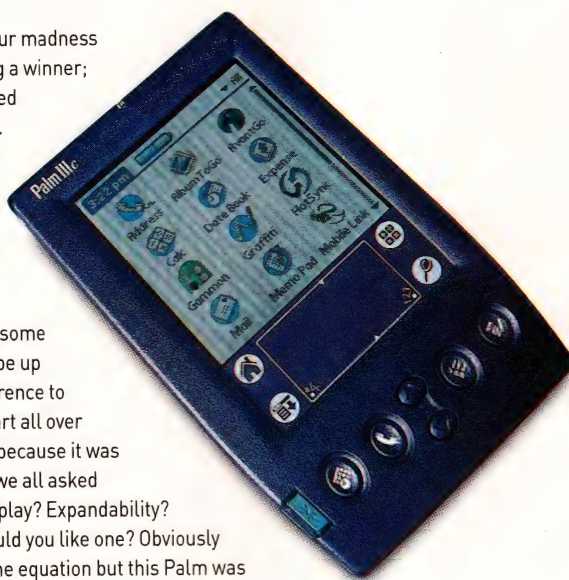
Picking two winners became a war of attrition as we weighed pros and cons up across some widely diverging devices.

PC Authority Labs Award for Quality

PDA Palm IIIc **Supplier** Palm Inc 1300 360 558 **Price** \$899



There was a method to our madness when it came to selecting a winner; the problem we confronted crossed several streams. Firstly we weren't comparing like to like, so generalities were the order of the day. Secondly not one had the feature set, functionality (or options) to completely satisfy a panel of discerning reviewers. Just when it seemed some consensus was reached someone would pipe up about a feature that they didn't like in preference to one of the others and the process would start all over again. The Palm IIIc eventually got the nod because it was the one device that satisfied the questions we all asked ourselves: Crisp text? Graphics? Colour display? Expandability? Build quality? Ease of use? Portability? Would you like one? Obviously keyboards and PC Card slots entered into the equation but this Palm was the baby that everyone wanted to rock.



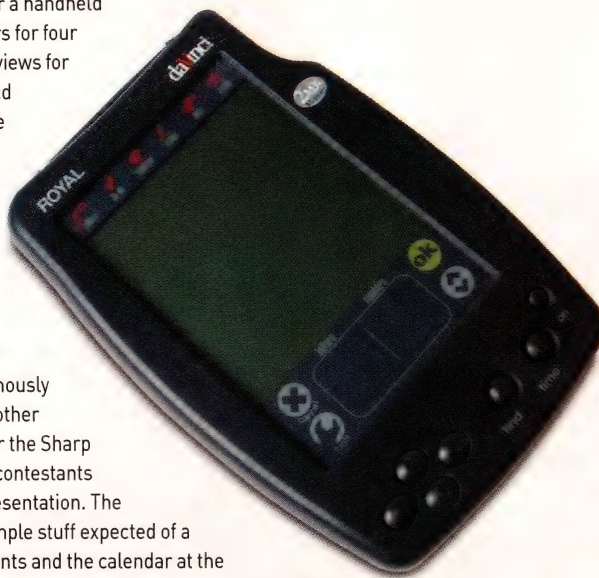
PC Authority Labs Award for Value

PDA Royal daVinci **Supplier** Smart Products (02) 9791 3155 **Price** \$299



What constitutes value for a handheld computer? We award stars for four categories in our Labs reviews for quality, features, value and overall and all of them are interrelated. For the Value Award then,

think of quality, the features that go into the handheld and then measure it against the asking price. The little-known Royal daVinci got our nod and it is incidental that it was also the cheapest. Everyone of the contestants did the job that they were asked. Feature sets varied enormously and some emphasised one feature over another like the Compaq Aero's audio capabilities or the Sharp HC7000's built-in camera. Everyone of the contestants were priced to match their features and presentation. The daVinci was light on features but did the simple stuff expected of a PDA, managing contacts, notes, appointments and the calendar at the cheapest price.



Honourable mentions

The Psion range deserves a mention simply for their superb integration of standalone applications. Only one black mark could be made against them and that was some glitches we found with the integration with the Windows desktop. From our PC-centric viewpoint it was fatal. By association the Ericsson MC218 is included being a rebadged Psion 5mx with the extra functionality of a modem included. Another mention goes to the Sharp HC7000. Difficult to see it as a PDA in the traditional, pocketable sense, but what a machine

Parting shots

Assertion one. Windows CE, as a top down descendant of a desktop operating system, simply appears too cluttered against the interfaces that were designed for these portable wonders from the ground up. Assertion two. Not one PDA will do everything for everyone. It's an imperfect world we live in.

We missed out on one of the new Casio and HP PocketPC devices, although we had a sneak demonstration of the new HP Jornada. It was sexy and colourful, in a form factor not unlike the Aero 1520. We'll reserve judging whether it matches the elegance of the interfaces designed from the bottom up for handheld computing instead of Windows approach which Microsoft engineered from the top down, until a prolonged play with it is possible.

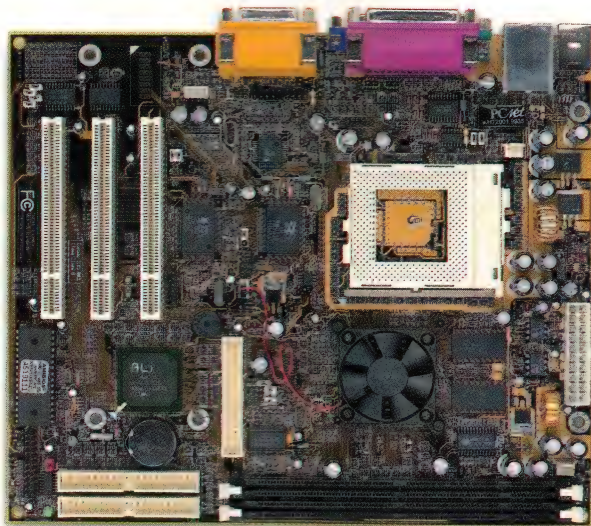
Next Month

We'll brighten up the middle of winter for you with a turn at colour inkjet printers. Colour printing technology improvements are continuing apace with other developments and luckily you can see what the differences are.



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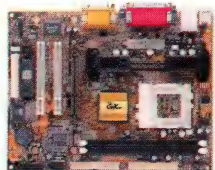
**P-III/Celeron
FC-PGA/PPGA**

**TNT2
Graphics**

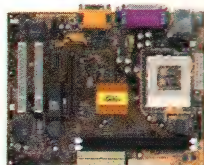
**3D 4-Channel
Sound**

**56k
Modem**

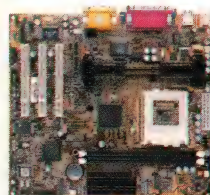
**10/100M
LAN**



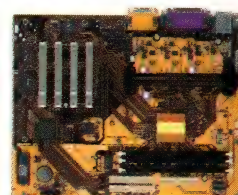
M756LMRT



M758LMR



M770LMRT



M800LMR

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Reviews

This month's selection of the latest hardware, software and reference titles.

PC AUTHORITY

Anatomy of an upgrade



Simon Tsang dissects the processes of upgrading and poses a few questions of his own.

So it seems that Intel has regained its balance of power in the battle of processor speeds with the recent availability of the 1GHz Pentium III, following AMD's moral victory on being the first to reach the milestone mark with its Athlon (reviewed issue 30, p76). And, for the moment it seems, Intel is proving to hold the upper hand in the sheer performance stakes thanks to its inherently scalable architecture and high bandwidth RDRAM, which is finally getting a chance to earn its keep after a disastrous entry into the world. But RDRAM is still around two to three times more costly than its SDRAM counterpart depending on which speed you get, thereby limiting its appeal to only highly specified machines rather than the mainstream.

And this is only one of the many complex technical issues consumers are now faced with when considering what type of specification to purchase as their next system. Not only with what's available now, but whether it will support products to come. The concept of future-proofing is still very much on the minds of consumers today. Upgrading is a mentality well ingrained in the PC buying fraternity. The notion of extending the longevity of a significant investment we make - and for most of us, a PC is an extremely expensive outlay - though, is perhaps not so exclusive to the PC industry.

When we buy a car example, we're concerned with its resale value when it comes time to sell or 'upgrade' it to a newer one. Thus we are effectively

calculating a changeover price for another purchase further down the track, hoping to keep this to a minimum but accepting that there will be significant depreciation. In a way then, we are trying to extend the investment we make by absorbing the cost of its upgrade or replacement with the retained value of the outgoing model. While a typical model cycle of a car can last anywhere from five to ten years - not counting mid-life face-lifts - PC technology lasts a fleeting six months if you're lucky.

Most of us (by 'us' I mean realists) have come to accept that depreciation for PCs is measured on a much steeper scale than something like a car. In fact, we don't realistically expect to sell it or trade it in for a newer one once we're done with it. At least, we wouldn't expect to get much for it. So we settle for alternatives such as upgrading in a vain attempt to save a bit of cash. But once the cost is added, we've probably spent about 75 per cent of the cost of buying a new system and are left with a semi-fast PC and a lot of useless parts.

And it seems the industry movers and shakers aren't going to make it any easier for the average consumer. Chipset revisions will continue to speed up to match overhauls in component standards such as memory and graphics in an effort to improve the overall performance of a PC. Processors will also speed up in greater increments now that a gigahertz has been reached. So where does the answer lie? In products such as the FishPC reviewed in this issue? Or perhaps the open source movement which should lead to a higher concentration of embedded devices rather than the dedicated PC. For now, there's no easy solution; we always seem to be on the verge of something better. Maybe the PC industry should just look up for a second and really consider how people will use what they produce instead of just producing what they will use.



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PREVIEW

Displayed with a product when it is in Beta or preview release.



This logo indicates that a version of this software is also available on the Linux platform.



This logo indicates that a version of this software is also available on the Apple Macintosh platform.

What's HOT ... and what's not

DELL DIMENSION XPS B1000r SE



Though Intel comes in second to AMD in reaching the 1GHz mark, it's shown itself to be worth the wait. Dell has done a great job

of wringing every bit of speed the CPU is capable of. See it on **p84**.



LEADTEK WINFAST GEFORCE2 GTS



Already in its second generation, we take an exclusive look at nVidia's

GeForce2 GPU and compare it against its predecessor on **p92**.



FISHPC
Dramatically stylised design, compact

size and translucent plastics cannot make up for an otherwise inadequate PC. See our verdict on **p88**.



! This month's selection

84 The mightiest Pentium of them all.



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99 Tune in to TV on your PC.



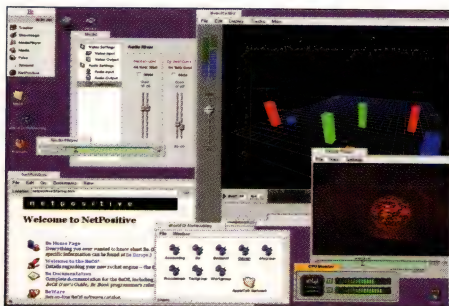
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102 Be who?



PC AUTHORITY

Ratings explained

EXCELLENT	000000
VERY GOOD	000000
GOOD	000000
AVERAGE	000000
POOR	000000
WORST	000000

FEATURES

Not just the quantity on offer, but are they up to scratch and do innovative features deliver?

PERFORMANCE

More than just raw speed, how well does a hardware product do its job?

EASE OF USE

How good is the documentation and training? Can you get up to speed quickly?

VALUE FOR MONEY

A perfect product is one that's sold at a competitive price.

CONTENT

How in-depth is the subject matter? Is the CD interesting and informative?

DESIGN

Does the book read easily? Can you find whatever you need quickly?

OVERALL

A weighted collation of all the scores.



Excellence: a product with no equal at the time. Unrivalled quality and value.



Recommended: if you're buying, then any product with this stamp should be on your shortlist.

Dell Dimension XPS B1000r SE



PENTIUM III/1GHz PC



Verdict A truly epic PC in terms of specification and performance. Intel's new 1GHz Pentium III also

proves to be a convincing 1GHz Athlon beater in both 2D and 3D applications.

Price \$8,518

Supplier Dell Computer 1300 303 273

Internet www.dell.com.au

Availability Now

System specification Pentium III/1GHz, 256Kb on-die L2 cache, 256Mb of PC700 RDRAM, Intel 820 chipset, 30Gb Quantum Fireball Plus LM hard disk, 64Mb Dell GeForce 256 DDR AGP 4X graphics card, Creative SoundBlaster Live! Value sound, 12-speed NEC DVD-ROM drive, 8-speed Sony CD-RW drive, Altec Lansing ADA-885 THX speakers, 19in P991 Dell FD Trinitron monitor, Conexant 56K modem, Windows 98 SE, Microsoft Works Suite 2000, Norton AntiVirus 2000, Enthusiast Game Pack, 3yr RTB warranty.

▶ A PC of truly Homeric proportions.

has clearly not held back in terms of specification.

To start, you have the 1GHz Pentium III CPU, with a massive heat sink attached, that is covered by a special duct leading to a large cooling fan mounted in the back of the case. The Dell motherboard features an Intel 820 chipset and sports a massive 256Mb of PC700 RDRAM. You still pay more for RDRAM compared with SDRAM, however. For example, the basic Dimension B1000r comes with 128Mb of RDRAM, and the upgrade to 256Mb costs a huge \$780, whereas an upgrade from 128Mb SDRAM to 256Mb SDRAM on a Gateway Select 1000 costs only \$410. While the extra bandwidth of RDRAM doesn't make a huge difference with slower processors, it certainly does help the PIII/1GHz to show its full potential. In the gruelling new *PC Authority* Benchmark suite the XPS B1000r SE smashed the previous high-speed record of 2.65 held by the Gateway Select 1000 (reviewed issue 30, p78), with a tremendous score of 3.10. Furthermore, demonstrating the difference in memory technologies, I ran the 1GHz PIII on the Labs testbench based around a VIA Apollo Pro 133A chipset and with 128Mb of PC133 SDRAM, and it only scored 2.90, which is a significant difference.

The 1GHz processor, 256Mb of RDRAM and 64Mb DDR Dell GeForce 256 AGP graphics card also provide staggering 3D performance. Not only did the XPS B1000r SE score an incredible 4,823 3DMarks in 3DMark2000 Pro, it also aced the Quake III Arena *PC Authority* Benchmark demo with an average frames per second of 52.2 at Normal resolution. This is especially impressive considering the VIA chipset and SDRAM-based testbench with the 1GHz processor only

scored an average 42.6fps in the same test.

Connected to the powerhouse GeForce card is a 19in Dell monitor sporting one of Sony's new flat FD Trinitron tubes. This monitor exhibits a vibrant and very clear picture and supports resolutions up to 1,600 x 1,200 at 85Hz, although it does have some very minor problems with screen geometry. Complementing the monitor in terms of multimedia functionality is a Creative SoundBlaster Live! Value card connected to a set of THX-certified Altec Lansing ADA-885 quad speakers with remote control. I must say that watching *The Matrix* on DVD on the XPS B1000r SE in a darkened room with the quad surround sound and volume up was an emotional experience.

The rest of the specification of the XPS B1000r is just as impressive as the benchmark results, and includes a 12-speed DVD-ROM drive, an 8-speed CD-RW drive, a 30Gb hard disk and a 56K Conexant modem. The software bundle will also keep you occupied for some time, and includes Microsoft's Works 2000 suite for productivity, and the Dell Enthusiast Game Pack, which includes the full versions of Grim Fandango, Baldur's Gate, Descent 3 and Sports car GT.

There can be no doubt that the XPS B1000r Special Edition represents the absolute pinnacle of personal computing as of today, and due to the shortage of 1GHz Pentium IIIs, it should remain at the cutting edge for some time to come. Of course, you pay to own the best of the best, and the XPS B1000r SE comes at the princely sum of \$8,518, which means its appeal will ultimately be limited to those power-hungry enthusiasts with plenty of money to spend. For this reason, I cannot justify giving the XPS B1000r SE a Recommended Award since it has such a limited appeal, but considering everything that it represents, it is a deserved winner of one of our rare and prestigious Excellence Awards.

Tim Dean

PC AUTHORITY

PERFORMANCE

000000

FEATURES

000000

VALUE FOR MONEY

000000

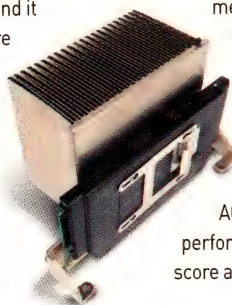
OVERALL

000000



Intel is still having great trouble meeting the demand for the 1GHz part, which means that only very few processors have been made available to any local PC manufacturers, and it

could be another month or so before the CPU becomes available in a retail box. Thus the rarity and massive price of the 1GHz Pentium III makes it a viable option only for those enthusiasts with plenty of dollars to spare, at least until volume production ramps up and more processors become available. Dell, realising this, has designated its new flagship Dimension XPS B1000r as a Special Edition, and is targeting it specifically at the ultra high-end power user, and

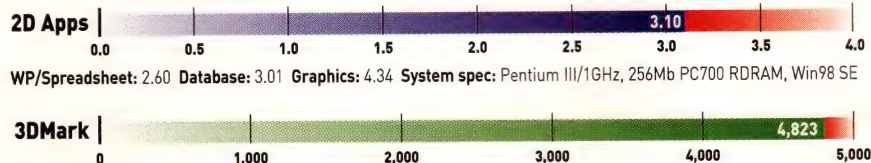


▶ Keeping 1GHz of processing cool is not an easy task.

Speed tests | Dell Dimension XPS B1000r Special Edition

Quite simply jaw dropping performance.

BETTER ▶



Score in 3DMarks in 3DMark2000 Pro at: 1024 x 768 at 16-bit colours



Gateway E-4400

PENTIUM III/700MHz PC



Verdict A top quality business PC with an excellent case design and strong performance.

Price \$3,699


Supplier Gateway 1800 500 742

Internet www.au.gateway.com

Availability Now

System specification Pentium III/700MHz, 256Kb on-die L2 cache, 64Mb PC600 RDRAM, Intel 820 chipset, 6.8Gb Quantum Fireball CX hard disk, 40-speed Toshiba CD-ROM drive, 16Mb ATI Rage Pro AGP card, 17in EV700 monitor, integrated SoundMax audio, 3Com Etherlink 10/100 PCI, Windows 98 SE, Intel LANDesk Client.



 A perfect case study in business PC design.



When it comes to purchasing one or more PCs for your business, there are several factors in addition to performance and price that need to be taken into consideration. Factors such as manageability, service and stability come under the umbrella term of TCO (Total Cost of Ownership), and are essential to making the right business PC choice. The initial outlay on a system ultimately amounts to only a fraction of that system's total cost over its lifetime. Other costs include the labour needed to set up and maintain the system, the lost productivity from system downtime, and the time spent performing upgrades. Gateway's new E series of PCs is targeted squarely at the business market, and as such makes the minimisation of the system's TCO its primary concern.

The main TCO reduction feature of the E-4400 is its specially designed case. Firstly, the lid of the case lifts off with the push of a small button on the front fascia, revealing the spacious interior. The motherboard is a large NLX-type configuration with the five PCI slots being mounted on a riser board that connects to the main motherboard. Each of the PCI slots has a small button that releases the card instead of the usual Phillips head screw. Each of the three 3.5in hard drive bays feature two levers that

allow the drives to be effortlessly removed. The external bays also feature small locking mechanisms that secure the drives instead of screws, enabling the individual units to be removed quickly and easily. Furthermore, the whole external drive bay assembly can be simply slid out the front of the case for even easier access or if you need to get to the RAM slots hidden underneath. Even the 200 watt power supply unit can be removed with the push of a lever. The only component secured with a screw is the AGP graphics card, which is mounted on the main motherboard itself, and not on the riser board with the PCI slots.

If you need to get to the whole motherboard for upgrades or maintenance, then the back panel of the case, with motherboard attached, can be popped out using a small handle on the back of the case. While all the other tool-free mechanisms feel very solid and are easy to use, this handle is the only device that feels a little flimsy and can be tricky to manipulate. Removing the back panel is easy enough, but getting it back into place can take a bit of work. In fact, after removing the motherboard and replacing it once, the whole system simply stopped working for me, and would refuse to boot past the basic POST. I had to remove and replace the motherboard twice more before the connection was firmly made and the system decided to operate normally again. Bare in mind, however, that this is only one complaint with a case that is, on the whole,

head and shoulders above its competition in terms of accessibility and functionality.

The specification of the E-series can be customised through Gateway's Web page, and you can choose from either an i820 chipset and RDRAM combination or i810 chipset and SDRAM, depending on your needs. The system that we have on test sports a fairly high-end configuration based around a Pentium III/700MHz and 64Mb of RDRAM, although by the time that you read this, the system will feature a Pentium III/733MHz, a bigger 20Gb hard disk, and will come with Windows NT 4.0 instead of Windows 98 SE. In performance terms, the E-4400 scored a reasonable 1.89 in the new PC Authority Benchmarks, meaning it has plenty of horsepower to deal with the office applications of today and tomorrow, and the Pentium III/733MHz system will be even faster.

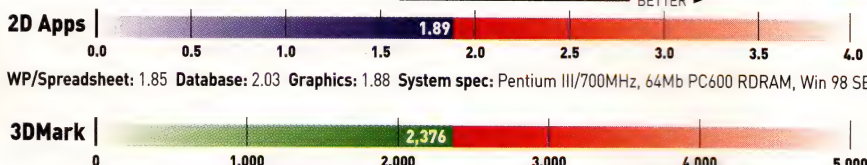
The 3Com 10/100 network card will get you on the network with a minimum of fuss, and supports advanced DynamicAccess features such as Remote Wake Up and Managed PC Boot Agent. The standard bundled software also includes Intel's LANDesk Client Manager, which can be used to remotely manage the system through the network.

The E-4400 is an excellent example of what a business PC should be, and its case is a model of design and efficiency. Given its strong performance and outstanding manageability features, the E-4400 is an ideal choice for any business, whether you are just buying the one, or whether you are planning to outfit a whole floor. At \$3,699, the E-4400 is also very reasonably priced.

Tim Dean

Speed tests | Gateway E-4400

Not the fastest, but plenty of power for office apps.



Score in 3DMarks in 3DMark2000 Pro at: 1,024 x 768 at 16-bit colours



PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

Gateway Profile 2

CELERON/500MHz TFT PC



Verdict An admirable all-in-one, but lacks the upgradability and legacy support of the

original Profile.

Price \$3,999

Supplier Gateway 1800 500 742

Internet www.au.gateway.com

Availability Now

System specification

Celeron/500MHz processor, 64Mb of SDRAM, Intel 810 chipset with 4Mb graphics buffer, 15in TFT XGA 1,024 x 768 screen, 20Gb hard disk, 6x DVD-ROM drive, internal 56K V.90 modem, internal 3.5in floppy drive, Windows 98 SE, MS Works Suite 99, Norton AntiVirus. Dimensions (w x d x h): 385 x 242 x 445mm; weight: 9.95kg.

We first took a look at the original Profile PC (reviewed issue 19, p82) from Gateway back in our June 1999 issue, and it walked away with a Recommended Award for leading the pack in introducing such a product into the Australian market. Others have since followed with variations on the theme such as Packard Bell's well-designed Spirit Z 500 (reviewed issue 29, p88) and Mitac's utilitarian Avenia LP6613 (reviewed issue 29, p89).

However, the strength of the original Profile's design, where the PC is built into the back of the 15in TFT display, is evident in its continuing sales alongside the new Profile 2 - Gateway's follow-up to the original. In light of the newcomer, the original Profile has been renamed the Profile 1s and repositioned as the entry-level model, while a Pentium III/500MHz version - tagged the SE - sits on the high end, leaving the Profile 2 in the middle.

More than a mere facelift of the original, the Profile 2 is in fact a compliment to the range as its design is markedly different. Instead of grafting its PC components into the display panel for an ultra slim depth like the Profile 1s, the second iteration packs its hardware into the base of the machine then mounting a 15in TFT display in front on a hinge. You thus sit closer to the screen than when compared to the 1s. Also,

▶ Second version extends Gateway's flat-screened PC range.



the power supply is integrated into the base as opposed to the external power adaptor used in the original.

The Profile 2 is also Gateway's first tear-away from legacy support, excluding connectivity to all devices not equipped with USB. Parallel, serial and PS/2 ports are nowhere to be found. In its place are four USB ports - two on the right, and another two around the rear. An additional pass-through USB channel is provided on the keyboard designed to handle the mouse. The mouse cord in turn is shortened so you won't have a clutter of cords on the desktop, but the mouse is curiously shaped. Its elongated design suits

larger hands but the ball located towards the heel of the mouse, instead of the front like 'normal' mice, means exaggerated hand movements are sometimes required to get the cursor to move.

The Profile 2's powerplant is an Intel Celeron processor running at 500MHz, mated to an 810 chipset motherboard and 64Mb of SDRAM. Its applications performance is well up with the pace of similarly specified desktop PCs, so, for its intended uses, shouldn't have too much difficulty with speed. Its standard issue 64Mb is rather sparse however, and there's no option to upgrade it beyond this capacity.

Unfortunately, 3DMark2000 Pro wasn't able to complete its run under the direction of the 810's graphic driver, so we weren't able to obtain any scores for the 3D category.

The screen is impressively clear and sharp with

a more than adequate level of brightness adjustable via a sliding bar control at the bottom of the screen. Its positioning forward of the base however, partially obscures the DVD-ROM drive from a normal seating height so making access a little awkward on occasions. Below this is the built-in floppy drive, power switch, internal microphone and a headphone jack. On the bottom corners of the base reside a set of forward firing speakers, each speaker shrouded behind a hard plastic perforated mask. A grab handle moulded into the back of the Profile 2 makes light work of relocation.

Visually, the Profile 2 appears to take up more real estate than the 1s, but a glance at the specs reveal that it is in fact smaller in every dimension. Though a large part of the Profile 2's target market will be businesses, home users may find its simplicity and compact dimensions enough justification for its price. Nevertheless, networkability will inevitably be a major part of its function. Therefore, in addition to the integrated NIC, Gateway has included Intel's AnyPoint Home Networking package which allows the PC to be networked in the home via the phone line.

Whether the Profile 2's styling is better than the original's is really up to the beholder, but it's not offensive, and adds a modern touch to any home or office. Its 'legacy-free' design, while noble, will only serve to exclude home users already with an array of serial and parallel driven peripheral hardware. This obviously will not be a problem for office networks however. But the limited RAM with no upgrade path may also be too much of a handicap for some potential customers.

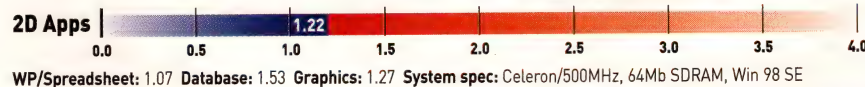
Simon Tsang



▶ Minimal desktop space required.

Speed tests | Gateway Profile 2

Reasonable figures for a modest specification



PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

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Finance available.


impact
Systems Technology Pty Ltd



FishPC

AMD K6-2/450MHz PC



Verdict Though displaying interesting elements in design, the FishPC as a whole needs a lot of improvement.

Price \$1,999

Supplier FishPC 1800 199 000

Internet www.fishpc.com.au

Availability Now

System specification AMD K6-2/450MHz processor, 64Mb of RAM, 8.4Gb hard disk, 24-speed CD-ROM drive, 5 x USB ports, V.90 56K internal modem, 15in monitor, SiS530 chipset with integrated graphics, audio, modem and network, USB floppy drive, Windows 98 SE, StarOffice.

Apple, it seems, is on the warpath to stamp out all remaining elements of what it deems iMac (reviewed issue 13, p74) look-alikes or rip-offs. Both Daewoo and Emachines have felt the heat from Apple relating to their all-in-one PCs which feature translucent plastics and colour schemes which allegedly infringe on the iMac's trade dress. With federal law suits against both companies settled, effectively banning sales of the existing products from either company until colour schemes are changed, Apple has turned its attention to an Australian start-up under the name of FishPC.

But, unless Apple holds a trademark on the use of translucent plastics - which it doesn't - there isn't much of a case here. From where I'm sitting - and that's directly in front of it as I'm writing this review - there's little that would cause consumers to mistakenly identify the FishPC for an iMac. While the settlement regarding Future Power's (a subsidiary of Daewoo) E-Power all-in-one system prohibits the company from making this machine in all the known iMac colours for the next four years, it would be misguided to lump FishPC in the same kettle.

For one thing, the FishPC is not an all-in-one system. The PC is a separate box to the 15in CRT monitor and not built-in like the iMac. And secondly, it looks *nothing* like an iMac. Frankly, the attention Apple is devoting to FishPC is rather complimentary to the design

▶ Innovation or imitation? Well, neither actually.



which in no way exhibits the same level of ingenuity, innovation, quality and spunk as the original iMac. Its name is derived from its cosmetics, which are sculptured to resemble a fish standing on its tail (or dangling from a hook depending on your imagination). This theme is carried to the gill-shaped ventilation slits on the side of the PC.

At a single price of \$1,999, there are five colours available, named simply purple, blue, red, navy (reviewed here) and orange with no options. The FishPC is based on AMD's EasyNow! platform which integrates the PC's major subsystems such as graphics, audio and networking onto the main

board in much the same way as Intel's 810e chipset. The specifications employ a SiS530 chipset controller to handle these tasks and supports ATA/66. The EasyNow!

'initiative' is an attempt to spawn stylish and innovative PC design free from the shackles of expansion cards and legacy support. It is this latter point that's drawing most of the marketing focus as the five USB ports - two on the front and three around the back - are all that's available for connecting peripherals to the FishPC. Being USB means that, in theory at least, the devices you connect should be easier to install.

Of course, you have to find the devices first.

The front loading CD-ROM drive is the primary design feature of the FishPC and the reason for its midriff bulge. It is mounted vertically with the flat-

side of the CD-ROM facing the user behind a translucent plastic cover. A release button raises the cover, which is hinged at the top, for loading the disc. The floppy drive is an external USB unit and colour matched to the PC, as are the small accompanying stereo speakers which are powered by the FishPC's external adaptor via a splitter cable. The monitor is a regular 15in CRT save that it is entirely translucent from bezel to base. Unfortunately, the display quality of the 15in tube is appalling with a pronounced wrap-around distortion-effect that cannot be corrected with any amount of adjusting. The keyboard also draws criticism for its vague spongy feel and tacky plastic detail. Although the keyboard itself is USB, its pass-through connector for the mouse is strangely PS/2, thereby interfacing with a PS/2 mouse. USB across the board would have made more sense. Performance too is extremely limited, relying on an underpowered AMD K6-2/450MHz CPU. You may as well also forget about running anything that requires 3D acceleration. 3DMark2000 Pro refused to even start up on the FishPC. I look forward to seeing future revisions with grunter processors. The internal layout however, is neat and well thought out with ample cooling supplied via two fans.

While there's little association with the iMac in appearance alone, conceptually, the FishPC is going for the same market. That is, easy to set up and use and primarily for the Internet. Considering that you can pick up a G3/350MHz iMac for less than \$2,000 however, the FishPC doesn't really present a strong case as an alternative.

Simon Tsang



Speed tests | FishPC

Performance is not its strong suit.



WP/Spreadsheet: 0.69 Database: 0.80 Graphics: 0.59 System spec: AMD K6-2/450MHz, 64Mb SDRAM, Win 98 SE



PC AUTHORITY

PERFORMANCE	888888
FEATURES	888888
VALUE FOR MONEY	888888
OVERALL	888888

HP LaserJet 3150

MULTIFUNCTION DEVICE



Verdict A budget-priced multifunction device with a wealth of features. Comparatively high running costs but network support is excellent, although shared fax, scanning and copying services will require an additional print server unit.

Price \$1,499

Supplier Hewlett-Packard 13 13 47

Internet www.hp.com.au

Availability Now

Specifications 600 x 600dpi mono laser, claimed 6ppm print speed, 300ppi TWAIN-compliant scanner, 14.4Kbits/sec fax modem, 2Mb of memory, Type C parallel port, RJ-11 socket, 3m parallel cable and phone cable included, HP JetSuite and ReadIris OCR software bundled, drivers for Windows 3.x/9x/2000 and NT 4 supplied.

Running costs Toner cartridge, \$129. Cost per A4 page (excluding paper), 5c at five per cent coverage.



There's no doubt that small businesses looking for a multifunction device for centralised printing, faxing, scanning and copying are now spoilt for choice.

However, many vendors have failed to note that this very same target market is also likely to have a network installed and will want to share all the functions among its users. With the release of the LaserJet 3150, HP has addressed this problem with networking high on the agenda. It supports printer sharing as standard and, when connected to a compatible HP JetDirect print server, the fax, scanning and copying facilities can also be networked. However, the print server will add around \$390 more to your initial outlay.

The LaserJet 3150 offers plenty of other new features such as assigning billing codes to outbound faxes and blocking up to 30 incoming phone numbers. Documents can be scanned directly into an email message as an attachment and the speed dial keypad can be configured with up to 250 fax numbers or email addresses. Recipients can view these attachments easily, even without the appropriate application installed as HP includes a HotSend utility that wraps itself around the attachment so it arrives as an executable file. See www.hotsend.com for more information about HotSend.

The LaserJet 3150 is well built with its curved

▶ The 3150 is well designed, well built and easy to navigate.

chassis surrounding a 600dpi mono laser print engine with a 6ppm quoted top speed. The scanner unit has a top true resolution of 300ppi that can be enhanced to a simulated 600ppi using software interpolation, while fax duties are dealt with by an internal 14.4Kbits/sec modem. The Type C parallel port is a useful feature as this supports cable lengths of up to 10m so you can position the printer well away from the host PC. Only a 3m cable is supplied while a longer version is an optional extra. Paper capacity for printing is 100 sheets of A4 or ten envelopes held in a rear input bin with a single-sheet feeder in front. Output capacity is also 100 sheets, and a manual lever redirects output to the front slot for a straighter path through the printer. Alas, printing costs are uncomfortably high as the toner cartridge (\$129) delivers 2,500 pages at five per cent coverage, which equates to over 5c per page.

As the 3150 is a GDI printer, the host PC specification will determine print speed. We used a Pentium/266 system with Windows 98 SE installed and saw a 15-page document completed at an average of 5.3ppm. A 24-page DTP-style document was completed at a rate of 5.1ppm, while scanning an A4 photograph to the host PC at 600dpi took a shade over five minutes. Manual copies were delivered efficiently. Scanning a document and creating ten copies took a total of two minutes.

Although text print quality was very good, Samsung made a better job of graphics and photographs. The LaserJet 3150 produced more detail but images suffered from an unsightly banding and results from scanning and printing an A4 photograph at 300ppi were actually better than those at the simulated 600ppi. Our five-page test business report was handled better as the various grey shades in the graphs were faithfully reproduced with minimal stepping in the edges of the pie charts.

The front control panel is well designed and easy to navigate. Copying and fax operations can be run without the host PC switched on, and HP reckons the 2Mb of internal memory

can store up to 150 pages of incoming faxes. Group distribution lists can be made for broadcasting faxes, and the LaserJet 3150 will scan and store the pages internally before sending them to each member of the group. It can also perform multiple functions simultaneously so you could be copying or scanning directly to a PC while printing another document.

HP bundles JetSuite and ReadIris OCR (optical character recognition) software with the printer. JetSuite is a comprehensive package that allows all the functions of the LaserJet 3150 to be controlled from the host PC. It gathers all the various functions into a single interface, making it easy to keep track of faxes and scanned documents. It senses when a page has been placed in the feeder and a Document Assistant utility pops up providing quick access for scanning, faxing or copying. All device settings can be accessed and configured from within JetSuite and even the speed dial buttons can be programmed from the PC.

As is usual with most multifunction devices, the price you pay for total integration is average print quality, although the number of features on offer goes some way to make up for this. At only \$1,499, the LaserJet 3150 is excellent value and is the best choice if you want all its functions available on a network.

Dave Mitchell

PC AUTHORITY

PERFORMANCE

000000

FEATURES

000000

VALUE FOR MONEY

000000

OVERALL

000000





If it's worth doing, it's worth saving.

Save your work somewhere safe Whatever your job, budget or computer, iomega offers a back up solution that will also let you share your work with the millions of people who already rely on iomega products.

A safe place Zip® drives are now used by over 30 million people. They are available in either 100MB or 250MB capacities.

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Safety in a small package The Klik!™ PC Card drive fits into the PC Card slot of your notebook. This compact drive lets you store, protect and share up to 40MB of information. Requiring no power supply or cables, the Klik!™ PC Card drive is the perfect solution

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Safety for professionals Make sure your most valuable work is safe. Store it on the 2GB Jaz® drive. Jaz works with both the 1GB and 2GB Jaz disks and has the performance to handle any job you throw at it, no matter how big or complex.

For more information or advice on the right solution for your needs, call 1800 624 929 or visit our website www.iomega.com.au



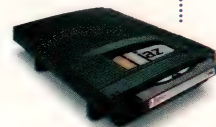
250MB USB Zip® Drive.



Klik!™ PC Card drive.



ZipCD™ drive



2GB Jaz® drive.



www.iomega.com.au

Canon CD-300

DIGITAL PHOTO PRINTER



Verdict A high quality photo printer with features to extend your creativity.

Price \$1,199

Supplier Canon Australia 1800 816 001

Internet www.canon.com.au

Availability Now

Specifications 300 x 300dpi colour dye-sublimation digital printer, CompactFlash Type II slot, PCMCIA/JEIDA 4.2 Type II slot, parallel interface for PCs, composite video in/out, S-Video input, drivers for Windows 95/98. Dimensions (w x d x h): 249 x 262 x 94mm without the automatic paper feeder; weight: 2.7kg.

Running costs 36-sheet paper and ink ribbon cartridge packs: \$44.95; 18-sheet panorama paper and ink ribbon packs: \$52.70. Cost per standard 169 x 100mm page: \$1.25. Cost per panorama 276 x 100mm page: \$2.93.



While most adopters of digital cameras have relied on inkjet printers to reproduce their outputs on paper, alternative devices have been steadily on the increase. The digital photo printer is one such device. These

let you print your photos directly from your digital camera's memory card while previewing it on a TV. A PC therefore, is not required in the process. We first looked at a sample of this in our March issue presented in the form of an Olympus Camedia P-330E (reviewed issue 28, p90). I was suitably impressed with the versatility in its functions and intuitiveness in its design, as well as its output quality, and subsequently, it walked away with our Recommended Award.

Any competition thus, would have an extremely tough act to follow. But the Canon CD-300 not only matches the Olympus feature-for-feature, it also introduces some remarkable functions and technology of its own. Similarly sized to the Olympus, the CD-300 is housed in a smooth, slightly metallic, golden-silver plastic case giving it a somewhat retro appeal and colour-coordinating it with Canon's own PowerShot S digital camera range. Its layout is also similar to the Camedia printer as far as the automatic paper feeder tray slots into a bay on the bottom right hand side, and the memory card reader is on the upper left.

The ink ribbon cartridge however, is loaded from the front instead of the side, but its

High quality photos or panoramas in an instant.

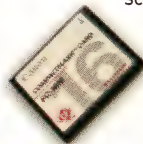
orientation within the printer is the same. Where the Canon does differ significantly in design is its implementation of the control buttons. The Camedia P-330E relied on mechanical controls for adjusting the sharpness and specifying the number of copies, as well as providing a button on the printer for each mode of operation. This was necessary as the Camedia did not employ an on-screen menu as its interface. All options were selected directly from the control panel of the printer itself.

The Canon's control panel however, has fewer buttons - all of which are feather-touch and not mechanical - and augmented by an on-screen menu display which guides the user in navigating through its various functions when connected to a TV via the composite video connector. The various menu options are displayed on the left of the screen with another area along the bottom reserved for instruction messages. Once you insert the CompactFlash (CF) card, it immediately loads up thumbnails of the pictures stored in the memory. From there, you can navigate around the screen using the arrow buttons on the printer's control panel.

In addition to the CF slot, the CD-300 also supports a secondary input via the Type II PC Card slot which is provided in order to accommodate other types of memory cards such as SmartMedia and Memory Stick through the use of a PC Card adaptor - although both slots cannot be used simultaneously. The printer can also connect directly to

digital cameras and camcorders via its S-Video and composite video inputs with the former taking priority over the latter if both are connected.

A big selling point for me though, is that the CD-300 is capable of borderless printing, transferring the image to the very edges of the photo paper. The paper itself has also been designed with this feature in mind with perforated tear-off bleed edges on both sides. Another feature which almost sells the product on its own



Print photos straight from either CompactFlash cards or PC Card adaptors.



**1st
OZ
REVIEW**

is the panoramic stitching function which

at first, I have to admit, I was a bit sceptical of. However I was categorically blown away when I saw the results. This function lets you stitch together three frames taken of a panorama scene with roughly 30 to 50 per cent overlap. Once the three frames are selected in the thumbnails mode, hitting the Preview button sets the printer to its task of stitching the frames together. Once completed, it displays the entire scene ready for printing. For this purpose, the CD-300 is also supplied with panoramic paper and feeder as well as a dedicated ink ribbon.

While the result will largely depend on how well you've taken the shots, the CD-300 will make the best out of even the most average compositions. I managed to achieve some seamless panoramas using only the 'Stitch Assist' mode in the PowerShot S10 (reviewed issue 30, p88) and no tripod. Out of interest, I used the PhotoStitch software supplied with the PowerShot S10 with the same three frames and compared the results. The output of the CD-300 was demonstrably better with a more intelligent degree of perspective correction.

While the CD-300 is \$200 more than the Olympus Camedia P-330E, it more than justifies every cent of it with its level of quality and features. If you're into digital photography and regularly require hardcopies of your images, then you should be seriously considering the CD-300.

Simon Tsang

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

Leadtek WinFast GeForce2 GTS

2D/3D GRAPHICS CARD



Verdict nVidia's new GeForce2 GTS chipset delivers staggering 3D performance, which will also

improve as further software support manifests. A high price, but you get what you pay for.

Price \$649

Supplier BCN Technology (02) 9648 0888

Internet www.leadtek.com.tw

Availability Now

Specifications AGP 4X, 2D/3D graphics card, nVidia GeForce2 GTS chipset, 32Mb DDR SGRAM, 350MHz RAMDAC, max resolution 2,048 x 1,536 16.7M at 75Hz, S-Video output, Windows 9x/NT/2000 drivers, Direct3D and OpenGL support, Colorific 3Deep, WinFastDVD.



nVidia has done it again. Following on from the sensational and popular GeForce 256, nVidia has just released its latest powerhouse 3D chipset called,

appropriately enough, the GeForce2 GTS (the GTS stands for Giga Texel Shader). The GeForce2 has many features in common with the GeForce 256, including the integrated transform and lighting engine (T&L), support for AGP 4X with fast writes, and Cube Environment Mapping as well as its utilisation of DDR (Double Data Rate) RAM. The main difference between the GeForce2 and its predecessor is that it's manufactured using 0.18-micron technology, compared to the 0.25-micron of the GeForce 256, which allows an increase in clock speed from the 120MHz of the GeForce 256 to 200MHz.

The specs of the GeForce2 are impressive indeed, with nVidia claiming it can manage as many as 25 million triangles a second, compared to 10-15 million with the GeForce 256, and with a fill rate of 1.6 billion texels per second, compared to the 480

The first GeForce2 GTS card proves to be a killer in performer.

million from the GeForce 256. While the simple increase in clock speed can account for the increase in triangle output, the increase in fill rate is also due to the new Hyper Texel Pipeline. A texel is a rendered and textured pixel, and each of the GeForce2's four rendering pipelines can apply effects to two pixels in each clock cycle. At 200MHz, the GeForce2 can output 800 million pixels per second, and using the Hyper Texel Pipeline this is doubled to a total of 1.6 billion texels per second.

Another new feature is the NSR (nVidia Shading Rasteriser), which allows per-pixel lighting effects to be rendered in real time. This means that the GeForce2 is capable of providing highly detailed lighting, bump map and shading effects on the surface of textures in hardware with little or no reduction in performance, although like T&L, software must be written using the appropriate Direct3D or OpenGL extensions in order to utilise this feature.

The GeForce2 also has support for DVD and HDTV playback, which are becoming increasingly important features of a graphics card, with features like motion compensation, up and downscaling, and decoding acceleration.

As with the GeForce 256, Leadtek is first out of the blocks with a product based on the new nVidia chipset. The WinFast GeForce2 GTS is a similar package to the GeForce 256 product, with Leadtek including its enhanced drivers and WinFastDVD player software, as well as including S-Video TV output. The WinFast drivers include information on the software and hardware versions, a tab for adjusting your display, whether it be CRT or TV, a gamma correction utility, and some detailed

Direct3D and OpenGL settings.

There is also a built-in overclocking utility which allows the chip clock to be set anywhere between 100MHz and 400MHz, and the RAM between 200MHz and 450MHz. I

managed to get the card running in a stable manner at 215MHz clock with 360MHz RAM, with a corresponding seven per cent increase in performance in Quake III Arena.

In performance terms the WinFast is quite simply phenomenal. Running on the PC Authority Labs testbench of a Pentium III/733MHz with 128Mb of PC133 SDRAM on a FIC KA11 motherboard, the WinFast managed an incredible 5,977 3DMarks at 1,024 x 768 at 16-bit in 3DMark2000 Pro, compared to the 4,634 of the previous reigning champion, the Creative 3D Blaster GeForce Pro. Quake III Arena performance is also similarly sensational with the WinFast sweeping the board at an average framerate of 47.9 in the gruelling PC Authority Benchmark Demo at High Quality, compared to the 40.5fps of the Creative card. And as more games are released that support the advanced T&L and NSR features of the GeForce2, you can expect performance to increase even further. There is already a significant list of games that will be supporting the GeForce2 features including notable titles like Black and White, Messiah, Giants, and Dungeon Siege.

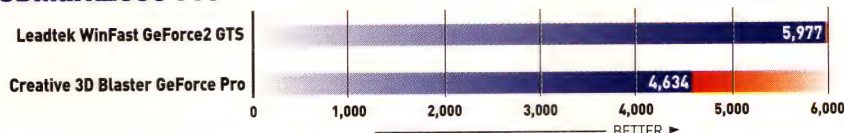
While the 3dfx Voodoo4 and 5 are due out very soon, they will have to be exceptional performers if they are to pose a significant threat to the GeForce2. The Leadtek WinFast GeForce2 GTS is a solid bundle, with feature packed drivers, TV output and a software DVD player. At \$649 the GeForce2 certainly amounts to being a significant investment, although if you are willing to spend the bucks, then you won't be disappointed.

Tim Dean

PC AUTHORITY

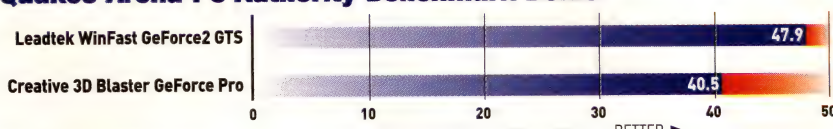
PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

3DMark2000 Pro



Score in 3DMarks at: 1,024 x 768 at 16-bit colour on Pentium III/733 128Mb PC133 SDRAM Win98 SE

Quake3 Arena PC Authority Benchmark Demo



Average frames per second at: High Quality 800 x 600 on Pentium III/733MHz 128Mb PC133 SDRAM Win98 SE

Elsa Erazor X

2D/3D GRAPHICS CARD



Verdict A solid package with excellent drivers and good software bundle, although the SDR RAM holds the GeForce chipset back.

Price \$599

Supplier New Magic (03) 9885 5888

Internet www.elsa.com

Availability Now

System specification AGP 4X

2D/3D graphics card, nVidia GeForce

256 chipset, 32Mb of SDRAM, 350MHz

RAMDAC, max resolution 1,900 x 1,440

16.7M colours at 85Hz, Windows 9x/NT/2000

drivers, Direct3D and OpenGL support,

Elsamovie DVD player, CorelDRAW SE,

Drakan, 3D demos.

Elsa is a German graphics card manufacturer that is particularly popular in Europe especially for its innovations in card design. This can be seen in the layout of the Erazor X, which is one of the few GeForce 256 graphics cards that is not based around nVidia's reference board. The Erazor features a much smaller PCB than most GeForce cards, which would serve to keep manufacturing costs down. There are two models of the Erazor available, the Erazor X, tested here, featuring a GeForce 256 chip and 32Mb of SDR (Single Data Rate) memory running at 120MHz, and the Erazor X², which features DDR (Double Data Rate) RAM running at an equivalent of 300MHz. With the recent announcement of nVidia's new GeForce2 GTR, the GeForce 256 is no longer the king of the hill in terms of 3D performance, although this also means the prices are sure to drop in the near future, making the GeForce 256 a good value option.

Installation of the card is relatively easy, with there being both an installation guide and a fairly extensive manual that covers the software and features of the card itself. The Elsa drivers are simple to use, yet quite powerful in the features they

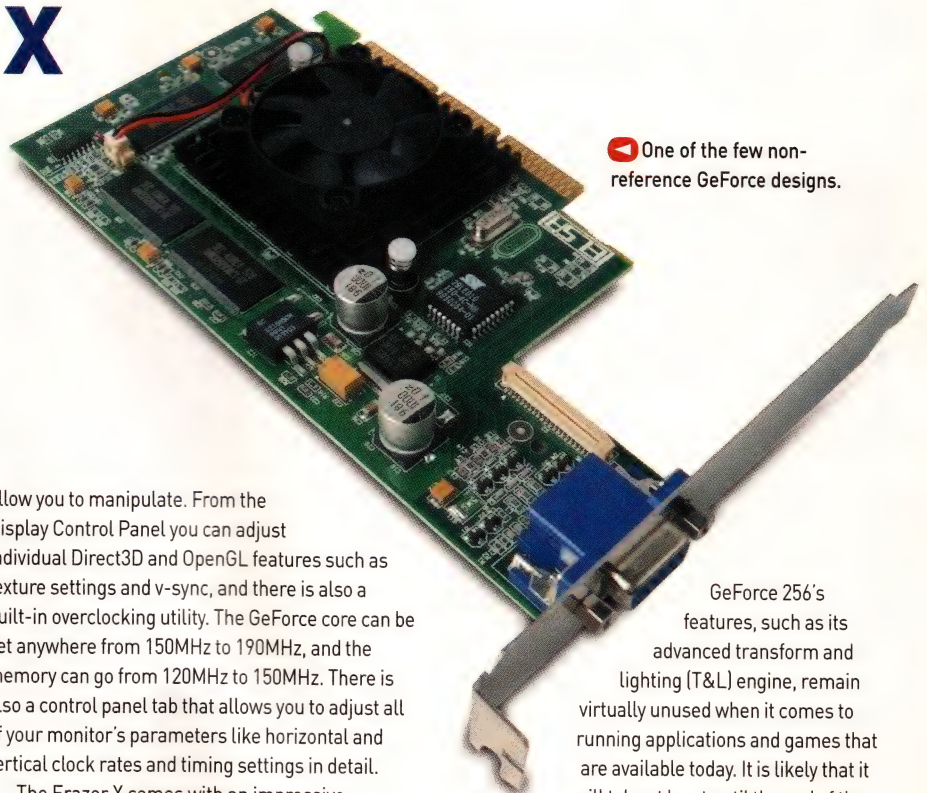
allow you to manipulate. From the Display Control Panel you can adjust individual Direct3D and OpenGL features such as texture settings and v-sync, and there is also a built-in overclocking utility. The GeForce core can be set anywhere from 150MHz to 190MHz, and the memory can go from 120MHz to 150MHz. There is also a control panel tab that allows you to adjust all of your monitor's parameters like horizontal and vertical clock rates and timing settings in detail.

The Erazor X comes with an impressive software bundle to round out the package. This includes a full version of the game Drakan Order of the Flame, as well as the Select Edition of CorelDRAW, a variety of 3D game demos and Elsamovie for watching DVD movies.

In performance terms the Erazor X is on par with other SDR GeForce cards, although it cannot quite keep up with the two most recently tested DDR cards, the Leadtek WinFast GeForce256 DDR and the Creative 3D Blaster GeForce Pro. Tested on the *PC Authority* testbench with a Pentium III/733MHz and 128Mb of RAM on a FIC KA11 motherboard using a VIA Apollo Pro133A chipset, the Erazor X scored a very reasonable 3,997 3DMarks at 1,024 x 768 at 16-bit colour in 3DMark2000 Pro, which compares to the 4,634 3DMarks of the Creative GeForce DDR card. Quake III performance is also strong with the Erazor X managing a decent 31.7fps at High Quality settings in the rigorous *PC Authority* Benchmark demo.

It still remains, however, that a lot of the

➤ One of the few non-reference GeForce designs.



GeForce 256's features, such as its advanced transform and lighting (T&L) engine, remain virtually unused when it comes to running applications and games that are available today. It is likely that it will take at least until the end of the year before applications arrive that

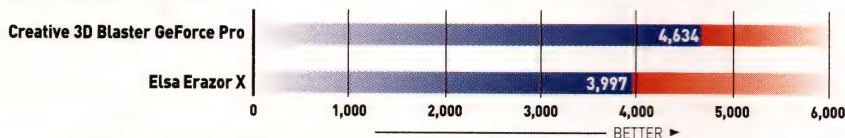
are properly optimised for the T&L engine, and the GeForce 256's other features. By that time there will be a couple of generations of graphics cards released, each with vastly higher levels of performance than the generation before.

Furthermore, the powerful GeForce256 chipset is being held back by the relatively slow SDR memory on the Erazor X, as shown by the performance comparisons with the DDR GeForce cards. The Elsa Erazor X is certainly a speedy card, although it is not the cheapest around. If you are looking for the highest possible performance, and you can afford to pay the latest premium, then a GeForce DDR, such as the Erazor X² or one of the new GeForce2 GTS cards would be more your style. Alternatively, you can now get cards based on the older nVidia Riva TNT2 or S3 Savage2000 for very reasonable prices, although these cards lack the raw grunt and T&L support of the GeForce256.

As a total package, the Elsa Erazor X is very attractive, with strong performance, well-designed and feature-packed drivers and a good software bundle, and will especially appeal to upgraders due to the ease of installation and thorough manual. With the release of the GeForce2 GTR, prices should also drop over the next couple of months.

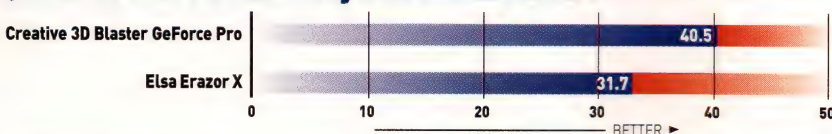
Tim Dean

3DMark2000 Pro



Score in 3DMarks at: 1,024 x 768 at 16-bit colour on Pentium III/733MHz 128Mb PC133 SDRAM Win98 SE

Quake3 Arena PC Authority Benchmark Demo



Average frames per second at: High Quality 800 x 600 on Pentium III/733MHz 128Mb PC133 SDRAM Win98 SE

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

GemPC 410

SMART CARD READER



Verdict A great idea for system security, although not for the typical end user.

Price \$90 Est.

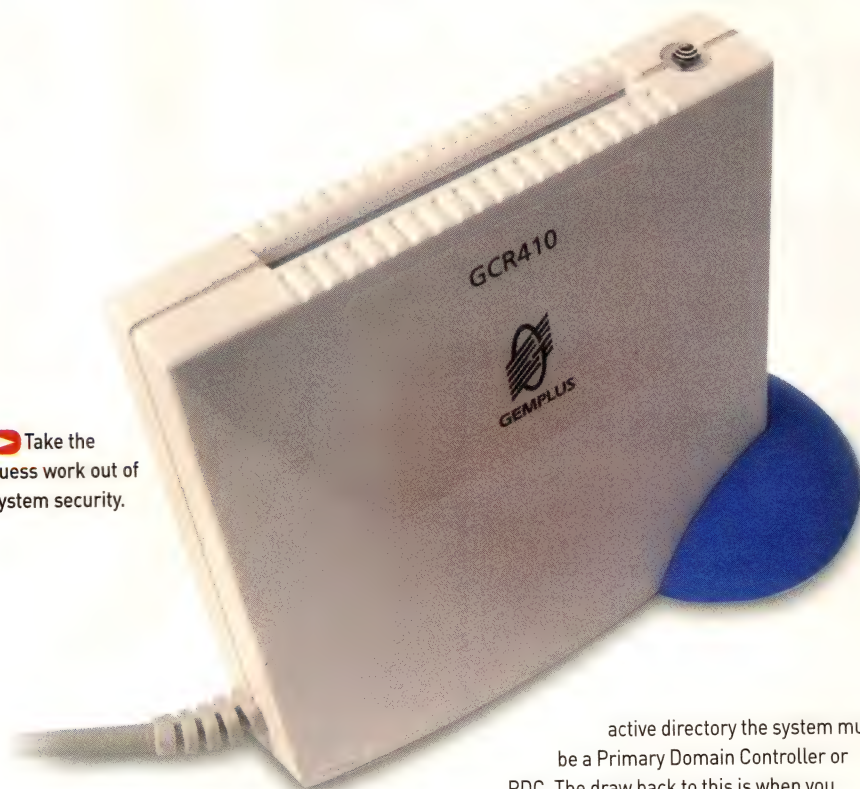
Supplier Gemplus (02) 9844 5442

Internet www.gemplus.com

Availability Now

Specifications Smart card reader and writer for all ISO7816-1/2/3/4 memory and microprocessor, serial connection to PC (also requires PS/2 port), supports 3V and 5V cards. Dimensions (w x d x h): 26 x 85 x 86mm. Supports DOS, Windows 3.x/9x/NT 4/2000, OS/2.

▶ Take the guess work out of system security.



In an age where security is a major issue, it is no surprise that a lot of money and resources have been poured into any technology that will protect a company's interests. You've probably heard of smart cards, without knowing exactly what they are or what they can be used for. A position I discovered I was in soon after starting this review. As with most fragments of modern technology, smart cards are slowly being integrated into our daily lives. A prime example - if you have a digital mobile phone, you are already using a smart card, as the SIM card used in phones are smart cards.

Another application of smart cards is system security, and the GemPC 410 smart card reader is designed just for this purpose. In a corporate environment where sensitive information is kept on a system, a machine can be configured to only allow users possessing smart cards to log on. And as every smart card has a unique number as part of its security construct, it is virtually impossible to copy a card. The GemPC 410 connects to the system via a serial port, as well as drawing power from the keyboard's PS/2 port using a pass through adaptor.

As with most new hardware for PCs, the GemPC 410 has the 'Made for Microsoft Plug and Play' certificate, but unfortunately the install process turned into a 'plug and pray' exercise. The device is supposed to

have native support under Windows 2000, but it only recognised the device after many hours of trying, and several reinstalls of the OS. Once the unit was actually installed, it worked surprisingly well - Windows that is - and I stress the point, all the problems encountered were from the OS not the device. But as with all devices, it does pay to read the manual and to have it handy while installing the product. When the reader was connected to a Windows 98 machine, I had even more problems - but they were eventually fixed. The problem under Windows 98 turned out to be the Logitech mouse driver which was scanning all COM ports while initialising - this was causing the reader unit to fail. A quick registry hack was required to fix the problem.

After the unit is recognised you still have a fair amount of work to do before you can use the smart card reader. The system must be set up to use one of the new features of Windows 2000 - the Active Directory. Again this is one area where the manual is a necessity as the online help from Windows is vague at best. To use the

active directory the system must be a Primary Domain Controller or PDC. The draw back to this is when you reconfigure Windows 2000, you effectively lose your settings and have to start from scratch. Once Active Directory is set up you must install the certificate services - once this operation is complete the machine cannot be removed from, or added to, a domain. When all certificates have been installed, you can then start issuing smart cards to your users.

Under Windows 2000 the issuing process has been optimised for ease of use. All certificates are issued using an HTML front end. It is very similar to using any of the wizards supplied across the Windows platform in that all you have to do is fill in the blanks. After selecting a few options for the card, all you need to do is select the user name and click on the 'Issue card' button. Assuming everything is installed correctly Windows will then write the user information to the card.

Once the card is ready, you then have to set the options for the user account, and what they can and can't do with the card. Among its many features, you can restrict access to the Web to only user accounts with smart cards. I found the way in which Windows actually handles it interesting. As it displays pages as secure HTML, a site address would be <https://www.pcauthority.com.au> instead of <http://www.pcauthority.com.au>. Plus you still have all the usual Windows security features, such as file access and device sharing. And as the GemPC 410 is designed to fit right into the security features of both Windows 98 and Windows NT, you have complete control over the system's security. Due to the differences in Windows 98 and Windows NT security systems, you have far more options under Windows NT - as Windows 98 only makes use of around half of the functions included in the common security DLL file.

As mentioned before, one of the many



▲ A PC Card version of the reader is also available.

Smart Card Technology

Almost everyone by now has seen the predecessor to the smart card - the old magnetic strip cards. These were designed specifically for the purpose of identification and security. Unfortunately these magnetic cards have several downfalls - put one near a magnet and you run the risk of wiping the information on it. Also, the information on the card isn't very secure as the information can be copied fairly easily. As you can imagine, the lack of security nowadays would concern everyone using a credit or key card. This is one of the reasons why smart cards were designed. It has a higher degree of security as well as the ability to process the information kept in it - i.e. updating or calculating values - which is something the old magnetic strip just can't do.

The smart card looks just like a credit card, some with a contact panel to one side. The card has an embedded computer/smart chip that allows it to store and process information - hence its name. The chip holds various types of information in electronic form with sophisticated security mechanisms. An average smart card can hold up to 200 A4 pages of data. There are currently three different types of smart cards: contact smart cards,



which require a physical contact between the contact panel and a read head; contact-less smart cards, that need only to be passed within close proximity to an antenna; and a combo card using both contact and contact-less technology where the card is designed for both building and system security. It will give access to a building, log you onto a machine, and at the end of the day, let you out of the building. The idea behind this is complete security of the work place.

There are four phases to the production of a smart card. The first phase is moulding, where the raw material is heated and injected into a press, forming a white plastic card with the same dimensions of a standard credit card. The second part of production is the printing stage, where any designs, graphics or logos are printed onto the surface of the card using a four stage printing process.

The third stage of production is where the semiconductors are assembled into the modules, which will be fitted into the card in the final stage of production. The semiconductors are fixed onto a film with a silver filled conductive epoxy - an adhesive-like substance. After this, the circuit of the chip is



connected to the contacts of the module using solid gold wires.

After testing the modules and visually inspecting them for any defects, a machine then trims the card and encodes it with an integrated circuit (IC). The card cavity and the module are then coated with glue and both are fitted together to form the finished product.

As the advantages of smart card technology are beginning to be realised, more and more companies are finding applications for them. Be it for either building or system security, the smart card is quickly being adopted by many institutions. But again, smart cards aren't just limited to computers. One of the more common applications is in telecommunications. In addition to using these in GSM mobiles for the SIM card, some companies are also applying smart card technology for their pre-paid phone cards. Visa is currently looking at developing a smart card for storing your banking details. And due to the level of security a smart card offers, it should be relatively safe. Its 128-bit encryption abilities also makes it ideal for any form of e-commerce.

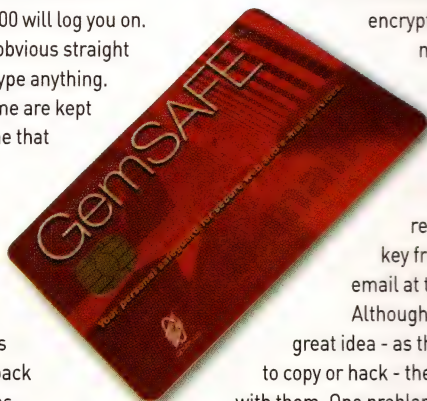
applications for the GemPC 410 is for automating the log on process. So instead of having to press Ctrl-Alt-Del, under Windows NT, and then entering your user name and password, all you have to do is insert the smart card into the reader and Windows 2000 will log you on. The advantages to this are obvious straight away, as you don't have to type anything. Your password and username are kept safe and secure from anyone that maybe watching you log on. Unfortunately the information is still susceptible to any applications that may be 'watching' for log on passwords - or the Windows NT hash, but this is a drawback to Windows security systems.

Also, as part of the many configuration choices, you can set

Windows to automatically log off when the card is removed - a handy feature, especially for those who normally forget to log out at the end of the day. Another feature of smart card technology is that

due to the security construct, you can encrypt files and emails on your machine, effectively stopping anyone from reading or viewing your documents. If you send an encrypted email however, the recipient will need the public key from your card to decrypt the email at their end.

Although the use of smart cards is a great idea - as they are virtually impossible to copy or hack - there are still a few issues with them. One problem is the amount of work in setting up a machine to issue the cards, and then the amount of options once the cards have been



issued. The process could be more efficient. On the plus side - the cards themselves are relatively inexpensive to replace if needed, one price range mentioned was around \$30-\$50, and considering the cost of new technology, this is fairly reasonable. This product isn't really aimed at the mass commercial market. The software is definitely designed for the network administrator or system specialist and not the typical end user. As you are making critical changes to system security, it isn't an area where end user experimentation is advisable.

Tremayne Sargeant

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

ASUS AGP-V7700

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Elsa 3D Revelator

3D GLASSES



Verdict Powerful and easy to use, the Revelator is an excellent addition to the gamer's wish list.

Price \$199 cable; \$249 wireless

Supplier New Magic (03) 9885 5888

Internet www.newmagic.com.au

Availability Now

Specifications Polarised 3D glasses, 140Hz refresh, 3.5m cable, D-Sub passthrough cable, glasses case, 1yr warranty.

The first 3D glasses reviewed in *PC Authority* were from H3D (reviewed issue 10, p81). These only worked using special software on 3dfx cards using the Glide API, and proved to be impressive, although a little too costly for the average gamer. Asus has been bundling in 3D glasses with generic Direct3D support with its Deluxe range of graphics card, and while game support is higher than with Glide, the software proved to be fairly unstable and crashed frequently, as well as often slowing the game to a crawl. Elsa seems to have learnt the right lessons from these products and has released the 3D Revelator, which manages to offer a convincing 3D effect and suffers from relatively few problems.

The glasses themselves are very light and have adjustable arms, although the nose rest is solid and unpadded. There are two versions available, one with a thin 3.5m cable, the other a wireless set that communicates through IR. The cable glasses reviewed here were easy to install, with the hardware component consisting of a short passthrough cable that attaches to your graphics card's output. The software and drivers for the glasses claim to work with any nVidia Riva TNT, TNT2 or GeForce-based graphics card, although even after installing the appropriate Revelator-enabled drivers for the Elsa Erazor X (reviewed

For the gamer who has everything.

p93), the software installer would still refuse to recognise it as a viable card. I did install a TNT2 card with nVidia reference drivers and it was detected immediately and henceforth worked without a hitch.

In the Revelator Display Control Panel tab you can adjust a variety of settings including the amount of apparent stereo separation. There is also an in-game control that can be brought up at any time, and can be used to adjust and fine tune the 3D effect without exiting the game. I tested the glasses with a variety of Direct3D games including a first person shooter: Half-Life, flight simulator: European Air War, a driving game: Rally Championship, an action/adventure game: Drakan, and a sports game: Michael Owens League Soccer. All games worked the first time although some had difficulties in menu screens that were hybrid 2D and 3D, and Michael Owens League Soccer exhibited some in-game glitches, with one eye still showing a little of the menu screen while the game was running. Otherwise the effect was very impressive and definitely added another level of immersion. One word of warning to lovers of first person shooters - your crosshair, which is a 2D sprite, is not rendered in 3D and ends up floating over the action, making it difficult to aim precisely.

Performance is also hit since the glasses require that your system render scenes from two different perspectives simultaneously for them to be displayed separately for each eye. Understandably this results in a roughly 50 per cent drop in frame rate when 3D stereo is enabled. The



basic TNT2, without stereo enabled, on a PentiumIII/733MHz system scored 2,952 3DMarks in 3DMark2000 Pro, and only 1,527 3DMarks with 3D enabled. With the current drivers, T&L support is also disabled on GeForce cards when stereo is enabled, although this should not effect performance too much at this stage.

At \$199 for the cable version, the Revelator is still not a budget option, although it is now an affordable choice for enthusiast gamers. The fact that four out of five games tested here worked perfectly first-go bodes well for the compatibility of the Revelator with current and future titles. So if you already have a powerful 3D card, positional audio card with surround speakers and a giant monitor and you are looking for that added dimension to your gaming experience, the 3D Revelator comes highly recommended. If, however, you are already struggling to play Half-Life at 640 x 480, or you only have a small monitor, then the glasses will not add much to your gaming experience.

Tim Dean

PC AUTHORITY

PERFORMANCE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

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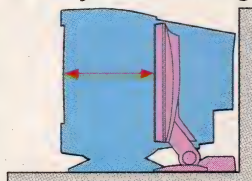
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HauppaugeTV USB-FM

USB TV/FM RECEIVER



Verdict A well conceived and feature-rich approach to TV viewing on your PC.

Price \$349

Supplier New Magic (03) 9885 5888

Internet www.newmagic.com.au

Availability Now

Specifications 125-channel cable-ready TV tuner (mono audio), FM receiver (stereo audio), audio cable, FM aerial, USB connection. Software: WinTV32, WinTV2000, VTPlus for Teletext, WinTV Radio, MS NetMeeting.



The idea of watching TV on a PC has been with us for a while now, and we've seen devices designed to perform this feat using every means of connectivity from internal PCI and ISA slots to serial ports

and more recently, USB. The concept of using your PC as an FM radio receiver however, is perhaps a more recent contrivance as in the case of the well applied D-Link USB PC Radio (reviewed issue 29, p106). The HauppaugeTV USB-FM seeks to combine both these broadcast mediums in one device.

Though hardly strong evidence for the case of convergence, it does highlight the increasing versatility of PC hardware and growing trend of using a PC for entertainment applications beyond the usual games. As an external unit, the HauppaugeTV device connects to a PC or notebook via its USB channel and requires an audio input in its sound controller. The only other connections it requires for its basic functions are an FM aerial, which is supplied, and TV antenna, which you'll have to find yourself depending on how you are receiving your TV broadcasts. It draws its power directly from the USB port so does not require any additional

external power adaptors.

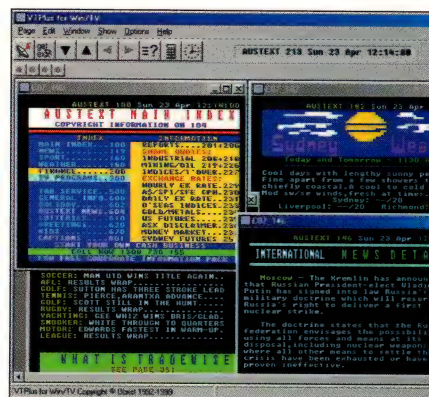
On the software side, there are primarily three components. WinTV2000 and WinTV32 both serve the same purpose of being the interface for the TV functions, though the former is the snazzier looking of the two. Once the software and drivers are installed, firing up WinTV2000 for the first time launches a tuning utility that prompts you to configure the country you are in and type of broadcast you will use HauppaugeTV for - it can also be configured for cable television. It then progresses to scan and detect all the available channels. It adds the channels it detects to a list from which you can actually customise the names.

FM radio is handled by the WinTV Radio applet that's far more ordinary than its TV counterpart, or D-Link's Radio software for that matter. Only the most basic functions are available for tuning and scanning with ten presets available to store your favourite stations. These can be customised with the station name by typing directly over the frequency in the display, but it doesn't accept names beginning with numbers. Absent are any form of recording functions so well implemented in the D-Link USB PC Radio. The third component is a VTPlus Teletext software that lets you tune into and view Teletext channels and information. You can also create scripts to automate the retrieval of Teletext data. This feature alone raises its status from novelty into a purposefully useful tool.

The HauppaugeTV can also function as a rudimentary video capture box via its S-Video-in and audio line-in ports to which you can connect your VCR or camcorder. It can also record directly from TV programs using the same functions, merely by changing the source option in the WinTV2000 software to a TV channel. Captured video is saved in AVI format. It can also grab single frame images using the 'Snapshot' facility at a range of selectable resolutions, and then saved as JPGs.

The main receiver itself acts as a junction box for all the various input and output connections, and finished off in a Bondi blue/clear translucent two-tone finish - which of course all USB products must be required to do. Setting up the HauppaugeTV USB-FM is a reasonably easy task if you're familiar with installing devices in the Windows 98 environment, and a setup guide is provided to step the

To watch TV on your PC, all you need is a spare USB port and audio input.



Print and save Teletext channels via VTPlus.

uninitiated through the process. But the bundle is sadly lacking in documentation to point the user to all the features it has to offer. I only managed to uncover its many useful functions by reading the claims on the box and drilling into the menus to find it. Otherwise, they can easily be missed despite the apparent ergonomics of the WinTV2000 software.

On the positive side, it doesn't require a substantial amount of hardware to run. I completed the entire testing and review on a USB-equipped notebook. As well as Teletext viewing, the HauppaugeTV can also be useful for monitoring certain programs as you're working or waiting for an interesting part to come on, which can save you a lot of time, and be of infinitely more value than just entertainment alone.

Simon Tsang

PC AUTHORITY

PERFORMANCE

000000

FEATURES

000000

VALUE FOR MONEY

000000

OVERALL

000000



A user-friendly interface to access HauppaugeTV's many features.

Red Hat Linux 6.2

OPERATING SYSTEM



Verdict Red Hat made Linux an attractive option on the desktop but the company now appears to be shifting its focus to the server environment. This release, although an incremental one, is worth a look despite it moving a few steps back in certain ways.

Price Standard: \$69.95; Deluxe: \$150; Professional: \$299

Supplier Tech Pacific (02) 9381 6444

Internet www.redhat.com.au

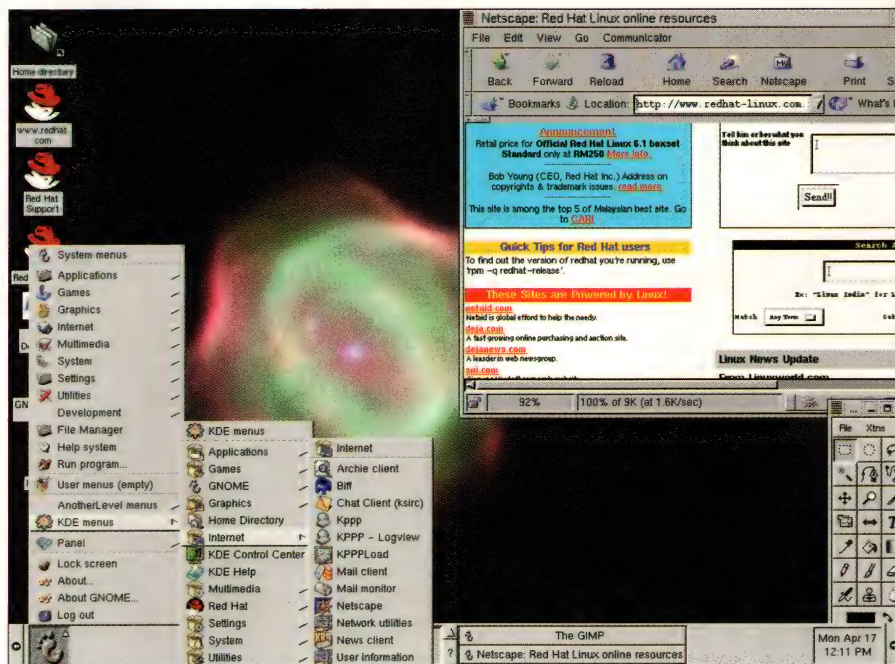
Availability Now

System requirements 386 CPU or higher, 16Mb of RAM for text version, 48Mb recommended for using either KDE or Gnome, 850Mb hard disk space for workstation, 1.7Gb for server, CD-ROM drive, and mouse.

Red Hat Linux 6.2 can be downloaded from the Web or bought as one of three boxed sets: Standard, Deluxe or Professional. A boot disk and two CDs with the operating system and source code are common to all three editions. In addition, the Standard edition includes 30 days access to a priority FTP server (for updates), 90 days of Web-based installation support, a 100-page installation guide and a documentation CD. Deluxe offers 90 days of priority access, and, besides the Standard components, has telephone installation support, a getting started guide, a CD with 30 third party applications, a powertools CD with 300-plus open source applications and an e-commerce credit card verification software package. The Professional edition offers 180 days of priority access, the Deluxe components, Apache and e-commerce credit card verification configuration support, a server bonus CD with 30 third party applications, a secure Web server with 128-bit encryption, a CPAN Perl archive CD, a full CD of IBM DB2 and 10 per cent off VeriSign SSL certificates.

Booting from a floppy or the installation CD gives you a choice of text-based or GUI installation procedures, although if you use the autoboot.bat file on the Red Hat install CD to boot from a DOS prompt, then only the GUI installation can be used.

The GUI installation was the main process used for testing the distribution, although after trying a couple of text-based installations, the latter proved to be generally easier and much more stable. New users will still prefer the GUI method, however since the on-screen instructions are simple and easy to understand. A choice of installations is offered: a workstation install with either the Gnome desktop or the K Desktop Environment (KDE), a server install, or a custom install. You can use a hard drive which has Windows installed and opt for



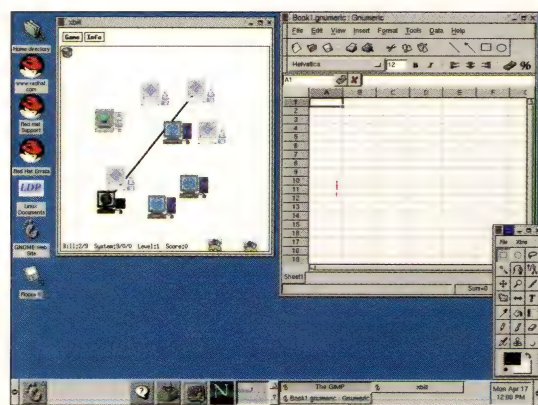
A work of art. One of the many space-based desktop graphics. Note the extent of menu spread when you do a full install.

a separate partition, or do what Red Hat has chosen to call a partitionless install - on the Windows partition itself.

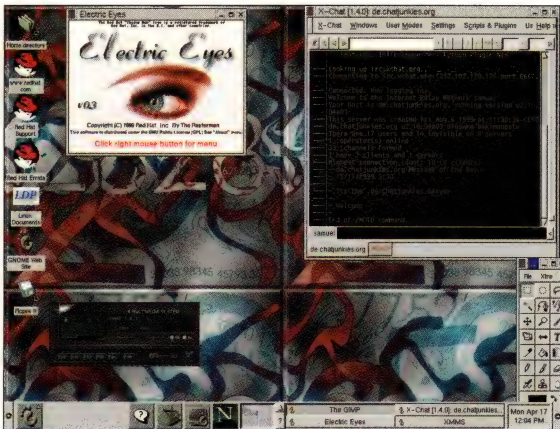
There would have been logic in adding this partitionless option if it could have been started from Windows, which would have made it easy for those who are contemplating a cross-over. This is not the case, however. This method of installing was very slow on a Pentium/166MHz PC with 64Mb of RAM - with a KDE workstation install (589Mb) taking 90 minutes. You can only start this setup from a boot disk which has to be made towards the end of the installation, but this is not clearly spelt out on-screen. If you do not make the boot disk, then the whole process would have been in vain. You may also end up the way I did, with a boot disk that gave error messages. About the only thing which this process facilitates is the easy removal of Red Hat; you only have to delete two files from your hard drive. On a Celeron/466MHz system, the partitionless installation proceeded at a normal pace and I ended up with a usable system. The only thing that you avoid is the partitioning of a disk but if you can successfully negotiate things up to the point where you select an installation option - and you have to do this - then you will definitely not find it difficult to create partitions.

Installing the operating system and associated applications on a separate partition does not take very long. On a system with a Celeron/466MHz

processor and 128Mb of RAM, it took 23 minutes to install everything from the installation CD and around 45 minutes from boot to restart. A Gnome workstation install (606Mb) took half an hour from boot to restart, including the configuration of the X window system. On a Pentium/150MHz PC, a custom installation of 369Mb took around 45 minutes. Red Hat detected most of the hardware on the three test systems but the GUI installation program had one shortcoming; you cannot configure a monitor at a resolution of anything more than 640 x 480 initially. For example, the video card and monitor on the Celeron system - a Diamond Viper V770 and a Hyundai DeluxScan - are listed in the Red Hat database, but when selected they were



On the left is a popular game for the penguin brigade: xkill, where you try to prevent Gates from replacing other operating systems with Windows. On the right is Gnumeric, a spreadsheet that rivals Excel.



A Simple, elegant design. Electric eyes, an image handling program from the creator of the enlightenment window manager. On the right is xchat, an IRC client and below right is an MP3 player.

not accepted. An 'out of range' message kept appearing until I changed to a generic monitor and the card which the installation program specified - a Riva TNT2 (the graphics chipset on which the Viper is based). Strangely, on your first post-install boot, you can run the Xconfigurator program (it has been there at least from the days of Red Hat 5.2) and change the screen resolution. The installation program makes allowance for non-Linux operating systems but does not bother about existing Linux installations. Contrast this with Corel Linux's creation of a menu to boot all operating systems.

It is clear that Red Hat favours the use of the Gnome desktop which is less stable than KDE. The KDE desktop on offer is stripped down and very basic. On both desktops, CDs are auto-mounted when inserted; an icon appears on the desktop and the contents of the CD are revealed in a window. A SCSI CD writer on the Celeron system was recognised during the installation with an entry created in the configuration file which lists the

devices that can be mounted. However, the automount facility did not trigger when this drive was used. A floppy disk can also be mounted using a desktop icon. The extent to which Gnome is favoured becomes apparent when one looks for the control panel and linuxconf - a GUI system-wide configuration utility. Both are easily accessible under Gnome but buried under KDE.

The sound cards in all three test systems were detected with no problem. A local printer was easily set up using printtool, a utility which has been with Red Hat for some time, although, a remote printer could not be configured. Many of the old utilities work just as well as they did when introduced some years ago.

Integrating a machine into a local network is relatively painless as with most Linux distributions. Network configuration is done during the installation process. Netscape Communicator is present and there are enough mail programs to satisfy even the most finicky user. Gnome comes with a nicely designed chat client, Xchat, and this works out of the box.

Dial-up users can connect to the Internet easily, provided you use the dial-up configuration utility installed along with Gnome. You have to configure the dial-up as root or superuser. The dialup utility detected all three modems, internal and external, used on the test machines. However, it was not immediately apparent that you have to use a separate tool to dial. And editing modem

parameters like initialisation strings can only be done via the command line. At times, using a dial-up connection from a machine that was part of a local network led to the network being cut off. KDE has a dialup utility called kppp which is much better, and which can be set up as a user, but it does not work unless you add some parameters to the options file for PPP. Modem parameters can easily be changed in the KDE utility.

There is a decent amount of software that gets installed along with either workstation setup. There is a good spreadsheet called Gnumeric which is basically a clone of Microsoft's Excel. Gnome has a

package manager GnoRPM, which reminded me of the little girl in the nursery rhyme: 'when it was good, it was very, very good, but when it was buggy it was horrid!' In contrast, KDE has a good package manager called KPackage. Red Hat's package manager can be used from the command line. The system lacks a good word processor though; Star Office 5.1 was provided with Red Hat 6.1 but this has disappeared. A demo version of a commercial office suite, Applixware, is provided instead. It is difficult to understand why at least a word processor like AbiWord was not included, which is part of the Gnome office suite under development, and is sufficiently stable to be used for writing this review. A new utility, Xpdf, can read PDF files, so Adobe Acrobat Reader isn't needed.

Core dumps are fairly common in Red Hat 6.2. A core dump is a snapshot of the execution of a program at the moment it is aborted by the operating system, such as when attempting to violate memory protection. Red Hat has already started posting errata on its Web site.



A What do you do when the boss is away? Gnome comes with plenty of games and KDE has a good number too.

The documentation is not as good or plentiful as it used to be, and the printed reference guide has been replaced by a CD-ROM. Considering the way 6.2 has been structured, it leads me to ask whether new desktop users are still Red Hat's main focus. Both SuSE Linux 6.4 and Mandrake Linux 7.0 offer more features and much more for the desktop user. It is apparent that Red Hat is leaning more towards the server and e-commerce market, probably to compete with Caldera's OpenLinux which has already made a name for itself in that niche.

Sam Varghese

PC AUTHORITY

EASE OF USE

000000

FEATURES

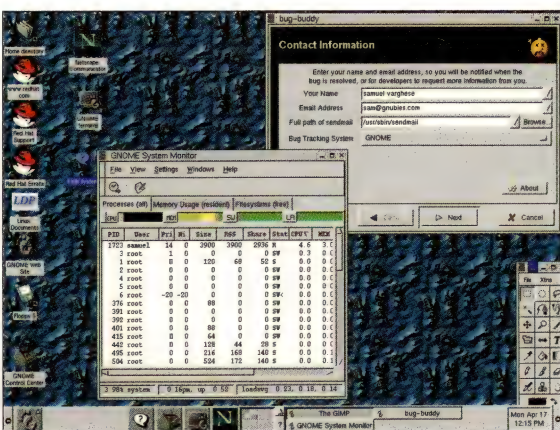
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VALUE FOR MONEY

000000

OVERALL

000000



A No, we ain't perfect but we're working on it: the Gnome window manager has its own bug report chart. A system monitor is on the left.

BeOS 5 Pro Edition

OPERATING SYSTEM



Verdict Be has created an amazingly stable environment for serious rich media developers that is well worth looking into. If independent developers offer a greater range of standard business software, BeOS will be a serious contender for the operating system of the 21st century.

Price \$139

Supplier Be, Inc.

Internet www.be.com

Availability Now

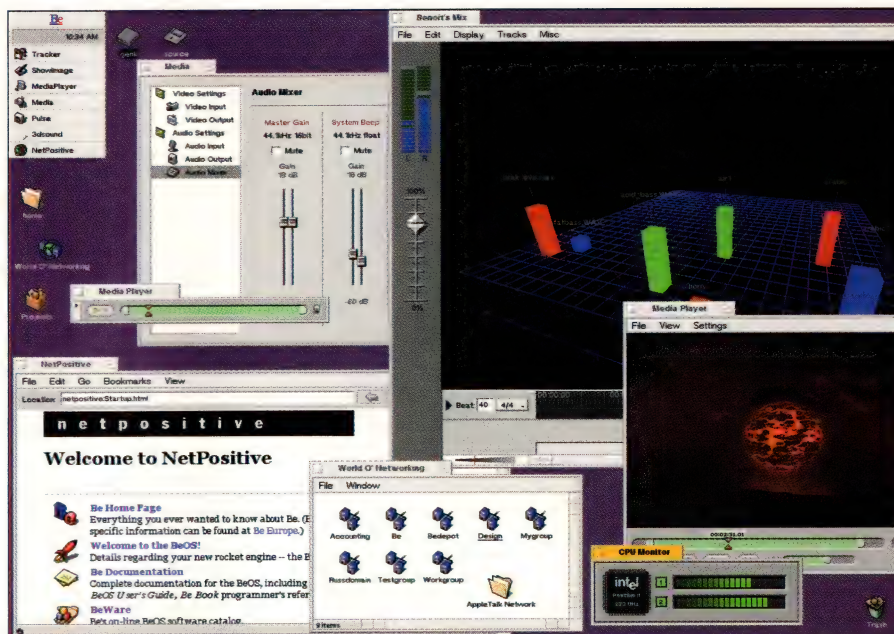
System requirements Pentium class processor, 32Mb RAM, 150Mb hard disk space, VESA compliant CD-ROM drive.

During the recent Microsoft Antitrust trial, Microsoft lawyers pointed out that it did indeed have competition in the marketplace from OS/2, Linux and Be, and many users looked up and said 'Be who?'. For many, this backhanded compliment opened their eyes to something new and much more useful in the graphics and creative computer field.

BeOS was specifically designed as an operating system to support graphics, video editing and music/sound manipulation, and was never intended to compete with the giants. The original intent was to fill a niche in areas where IBM, Microsoft and even Apple were weak or absent. More recently the OS has branched out with new versions that are intended as platforms for consumer electronic devices, Internet appliances and other dedicated hardware solutions. The company also recently announced partnerships with Compaq, National Semiconductor, Opera and Qubit.

Be and its creators are far from newcomers to the computer industry. Be's founder, Jean-Louis Gassée, was with Apple before he left to start Be, Inc. in 1990. Gassée is well known for helping to create the Apple legend overseas and started Apple's French subsidiary. He rose rapidly in the company and was soon moved to Apple headquarters in Cupertino, California, where he served as president of Apple's products division, managing the company's product marketing, worldwide manufacturing, and its research and development.

In the ten years since Gassée left his well paying job at Apple to build a totally new superior operating system, his original small office in Menlo Park, California - just north of the Stanford Campus and Stanford Research Institute - has grown from just a few people to over 100 dedicated developers and visionaries plus offices in Tokyo and Paris. Be is now publicly traded on the Nasdaq National Market under the symbol BeOS.



A Be comes with built-in and third party media applications that support network, workstation and single user media manipulation platforms.

Features

BeOS was designed from the ground up and, unlike other operating systems, is not layers upon layers of bug fixes that slow systems down. It was designed to run digital media applications with rich media content on basic systems with all the hard work being done in software, not hardware. The original BeOS was installed on dedicated 'BeBoxes' and Power PCs, but in 1997 Be launched Release 3.0 for the x86 platform. The current shelf version is Release 5.0.1, but recently Be took an unusual tack and in April offered a free Personal Edition of 5.0 Professional via the Internet in a 43Mb self-extracting EXE file.

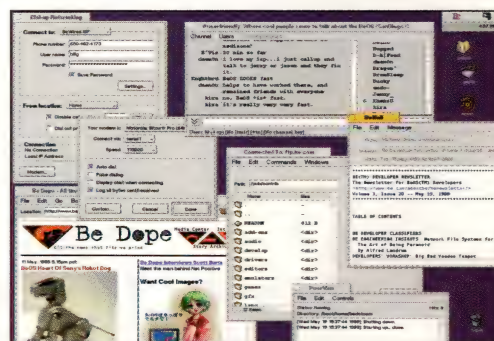
The intent of the company is to give users the opportunity to work with the system, which is a fully functioning version, not 'cripple-ware'. You download the Be executable, and from a Windows environment click on the executable file. The program expands to 500Mb in a 512Mb folder and with a click of the mouse on the white icon, 'RUN BE', Be dismounts Windows and loads itself. To restart Windows you need to reboot. Windows is not altered in anyway.

The Personal Edition lacks most of the freeware and shareware programs that come with the Professional Edition and there are only four of the Professional Edition's many demos. It also lacks the Internet Browser but does have a fully functioning mail program. The Personal version is also limited to about 11Mb of program storage space within its 512Mb folder. This is a matter of a 512Mb limit on any folder in Windows, not BeOS. The Internet Personal Edition (supplied on the cover disk) is an

excellent way to train yourself on BeOS before deciding to buy.

The command line option in Be is Unix format and easily recognized by Unix or Linux users. They will also see familiar directory structures like /usr, /usrbin, /dev etc. Be also has a rich GNU library. The average user, however, need never go this deep into the system because the OS is rich in useful managers and wizards. The system works fine with 32Mb of RAM and a super system needs only 64Mb of RAM. BeOS also has built-in SMP and can access up to eight CPUs automatically. The OS comes with a CPU-Monitor which not only allows you to view the activity of each processor, but allows you to turn any CPU off with a mouse click.

First time users will be surprised how easy the desktop is to manage. The initial screen displays all installed folders at the top of the directory tree, a welcome to Be HTML document, Trash Bin, home



A Be offers an easy to manage and set up TCP/IP platform and a 'Be-Browser' that has a very large viewing area.



A Be comes with over 25 resident applications and has over 1000 commercial, shareware and freeware programs available for it.

directory folder, demo folder, Third Party Software folder and a small drive folder if you install the system on the minimal sized drive. Be comes with quite a bit of freeware and shareware in the Third Party Folder.

Applications (even music) can be launched from the desktop, contact-sensitive menu bars (pop-up or pop-down) or from within Windows 3.x-like windows. All these windows, be they directories or launched applications, have live updating and don't miss a single beat if you move a box or resize it.

In the upper right hand corner of the desktop you will find what's called the Deskbar. The Deskbar can be moved to any corner of the desktop or placed across the top or bottom, Windows-style. The Deskbar shows not only what software and utilities are available but also what applications are currently open. Any application can be launched from the Deskbar.

Besides SMP, BeOS also supports a Linux/Gnome-like virtual workspace. Up to nine virtual workspaces can be used at any time, each with its own settings for number of colours, resolutions and screen views. Switching between workspaces or even moving files and applications between workspaces is a simple drag and drop operation.

BeOS' support for graphics, audio mixing and digital video is the best I have ever seen. And the protected memory allows you to have multiple

windows open, even mixed applications. Working in any window or sizing and moving windows has absolutely no effect on other windows. Music, video or graphics windows don't miss a beat while you work within other windows. In the event of a window/application crash, it has no effect on any other window. An error message box gives you full details of the problem and allows debugging. To date though, I have never had a crash in BeOS.

Internet and TCP/IP

BeOS comes with full TCP/IP protocols for networking and the Internet. The Be-Browser has an unusually large

viewing area and is a dream to configure. One of the problems I have with Be is that everything is so simple that I constantly feel like I have forgotten something. In networking, BeOS can be used as a client from any other system or as a server. Configuration is unusually easy with a minimum of screens, unlike most operating systems. In setting up my BeServer I installed a non-standard NIC and had to download the BeOS NIC driver from the manufacturers' Web site. There is no 'Add New Hardware' feature in Be, I simply placed the drivers in the appropriate folders and Be automatically mounted the hardware on the next reboot.

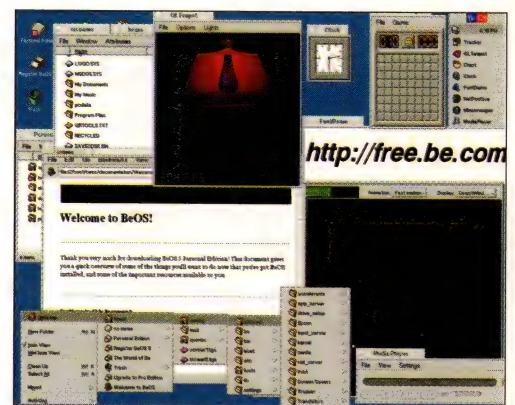
Installation

BeOS has to be the easiest operating system to install since DOS. The OS comes with a CD and a 3.5in boot/installation floppy disk. The CD allows you to install BeOS on an x86 machine, PowerPC or dedicated 'BeBOX'. The installation guide is simple, to the point, easy to read and has instructions for all four types of machines. I decided to install BeOS 5 on my 'Linux/Blue Box'. This AMD K6/166MHz machine had been used for OS/2 Warp 4 and Red Hat Linux on a single hard drive till I went to a caddie system and put Warp 4 on its own 4Gb disk. The unneeded partition was 1.3Gb on a Maxtor 2.7Gb drive.

The machine is booted from the floppy that also enables the CD-ROM drive. You then get a simple startup screen. The usual license agreement is displayed and then the installation program immediately displays a list of every partition on all three of my hard drives. After selecting the partition to install BeOS on, the program informed me the partition had to be initialised into a 1024 block size Oxeb (decimal 235) file system (BeFAT). Linux Fdisk can also initialize this type of partition. It also gives you the option to install

BOOTMAN if you don't wish to stay with your current boot manager. Within 12 minutes and without any further questions, BeOS was up and running. It probably would have been even faster with a newer CD-ROM drive.

If you need to install BeOS on a drive with no available partitions, the BeOS installation CD includes a copy of Partition Magic Special Edition. The program is self explanatory and after a welcome screen it gives you a choice of a 500Mb, 850Mb or 1.5Gb partition.



A The BeOS desktop is a feature rich environment with an effective protective mode operation.

The road ahead

Though the company has decided to compete with Microsoft by not competing with Microsoft, developers and users may have different plans for the BeOS. Be is incredibly stable and in the year I've been using Release 4.0, 4.5 and now 5.0, it has never crashed or locked up on me, whereas Windows is at least a once a day proposition.

With over 1000 commercial, freeware and shareware programs and utilities now available for BeOS and more on the way, the BeOS is on par with OS/2 and Linux for general usability and is nipping on the heels of Microsoft, except in the business applications area. If Windows developers also package their products with Be versions bundled on the same CD, like Lotus has done with Windows and OS/2, you will see more and more users opting for the Be version. Businesses will appreciate the quicker learning time for employees and the hundreds of person-hours a month saved by avoiding the daily 'blue screen of death' and routine Windows rebooting.

Thom Lyons

PC AUTHORITY

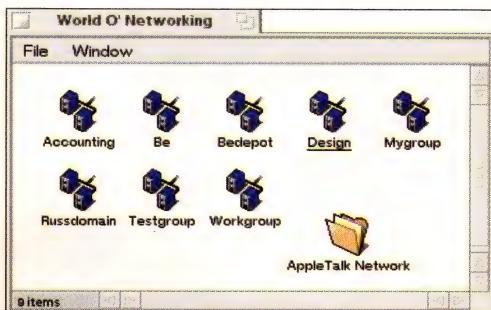
EASE OF USE

FEATURES

VALUE FOR MONEY

OVERALL

000000
000000
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A With its full TCP/IP stack for networking and the Internet, BeOS can be used as a client from any other system or as a server.

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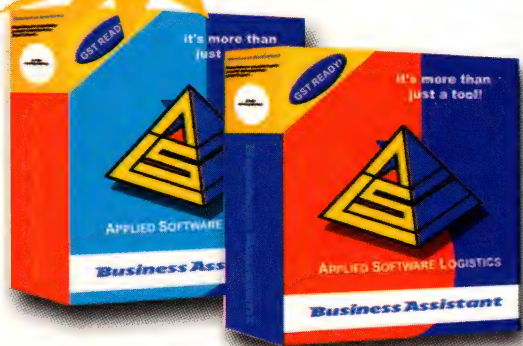
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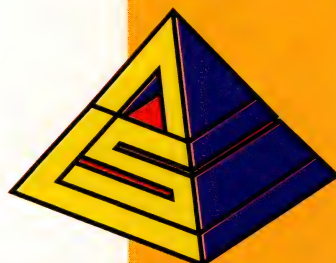
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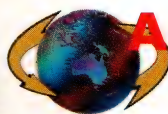
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(+)must be an advertised identical product offer. See website for terms and conditions.



FreeHand 9



GRAPHICS



Verdict A major repositioning for FreeHand emphasising Web and Flash output but at the cost

of lost ground in the program's core drawing power.

Price FreeHand 9 standalone, \$699; upgrade, \$269. Flash 4 FreeHand 9 Studio, \$899; upgrade for existing Flash or FreeHand users, \$339.

Supplier Firmware Design (02) 4725 8000

Internet www.firmware.com.au

Availability Now

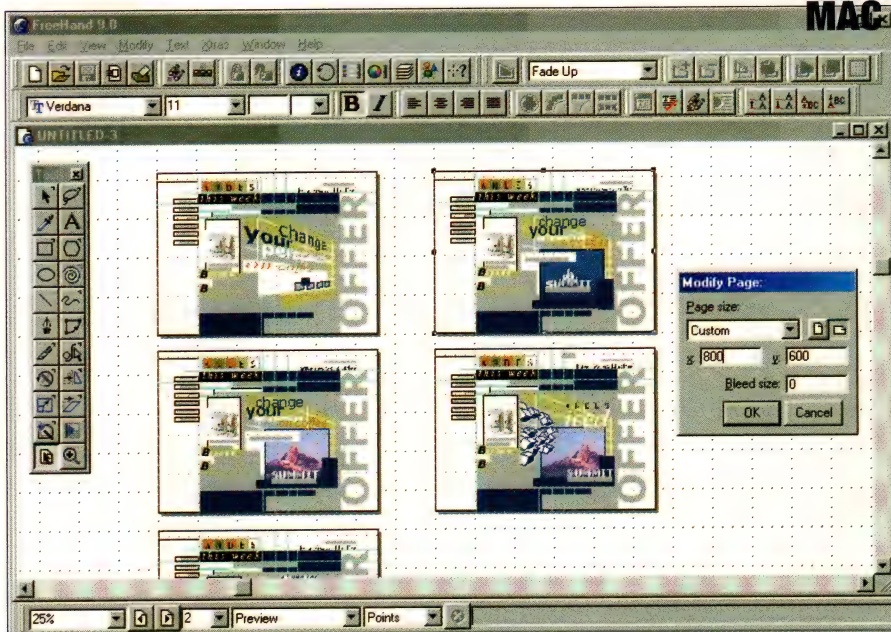
System requirements Pentium or higher, 32Mb of RAM, 70Mb of hard disk space, Windows 95/98/2000 or NT 4 (with Service Pack 3).

At one time - and not so long ago - the veteran drawing package, FreeHand, was Macromedia's flagship application. Since then, it has tended to get lost among the excitement of Macromedia's various Web offerings such as Dreamweaver, Flash, Fireworks and Drumbeat. Now, just when FreeHand users were beginning to wonder if Macromedia had completely forgotten about them, the company has brought out a new version designed to put minds at ease and to reconfirm FreeHand's central role in a publishing vision, straddling both print and Web.

First impressions though aren't encouraging. The first version of FreeHand appeared on the Mac in 1988 and the interface hasn't changed much since. The ugly and old-fashioned opening dialog is only the beginning. The overall working environment is clogged up with numerous differently-sized floating palettes and many central capabilities are only available via plug-in 'Xtras', which seem to pride themselves on their idiosyncrasy and lack of transparency. Compared to Illustrator, FreeHand does at least offer toolbars but the garish, non-standard push buttons look amateurish, as does the ugly non-standard system font used in many dialogs. Frankly, FreeHand looks awful and needs an overhaul.

New and improved functionality

Of course, as Macromedia regularly proves, a poor interface and usability are soon forgotten when made up for by leading-edge functionality. So what new power does FreeHand 9 offer? Two of the new tools on the main toolbar, the Spiral tool and the Eyedropper, were actually around in previous versions, but only as Xtras. The first genuine innovation is the new Lasso tool that allows you to quickly draw an irregular shape around those objects you want to select. If you double-click on the tool, you can also change between only selecting



A The new Page tool offers full interactive control over multipage layouts.

objects that are fully contained within the Lasso marquee or selecting any object that's touched. Also new is the ability to invert selections and to quickly select everything on the current layer.

Previously, of course, a Lasso tool would seem much more at home in a bitmap environment. The same is true of the reinvention of FreeHand's Trace tool as a Magic Wand. Double-clicking on the Toolbar icon calls up the Options dialog where you can set various parameters, such as the trace conformity and noise tolerance. Now you can also choose between RGB and CMYK colour models and, crucially, set a colour tolerance. This means that you can now click within any flat area of colour and the area will automatically be traced and converted into a new shape. This is great for creating new objects from partially obscured objects and, with shift-clicking, allows you to build up objects from multiple areas of different colours. The underlying tracing engine has also been made faster and more accurate so that, while not competing head-on with dedicated standalone solutions such as Adobe's Streamline and Corel's OCR-Trace, FreeHand's integrated Magic Wand will probably be far more regularly useful.

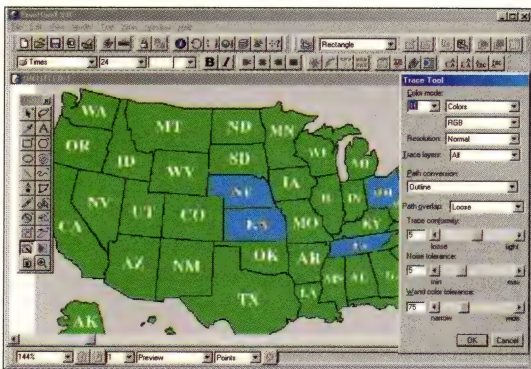
Another case of Macromedia making the most of existing power with some judicious tweaking is the introduction of the new Page tool. This capitalises on FreeHand's longstanding ability to handle multiple pages - especially compared to the resolutely single-

page Illustrator - by largely duplicating the power already available in the Inspector palette's document panel. Using the tool, pages can be interactively reordered, copied and deleted. By dragging on the page border, page size and orientation can also be changed and the resulting custom page sizes can be named and saved for later use. Technical artists can take advantage of the new ability to specify scaling with custom units of measure, ranging from Didots and Ciceros through to kilometres and nautical miles.

Other improvements that come under the catch-all miscellaneous heading include the FreeHand drawing tool's new Precision Slider, which controls the resulting line's smoothness and accuracy, an intelligent Expand Stroke dialog that picks up current attributes, and a sharper Knife tool capable of cutting paths with up to 32,000 points. Seriously



A The FreeHand 9 interface remains amateurish, ugly and old-fashioned.



A The Trace tool now acts like a bitmap Magic Wand, even allowing you to set colour tolerance.

useful is the addition of a Copies option to the various tabs of the Transform palette. This simple enhancement provides a step and repeat function so that multiple copies of an object can be offset, rotated, scaled, skewed and reflected - one of the most common of all design tasks. Such enhancements are undoubtedly useful, but they hardly set the pulse racing. Where are FreeHand 9's must-have killer features?

The first new feature that Macromedia is seriously promoting is its new perspective capabilities. You can now set up a background perspective grid with up to three vanishing points and with customisable grid cell size and different colours for left, right and horizontal grid lines. Using the dedicated Define Grid dialog, you can also name and save grids for reuse, but it's generally much easier to create and control grids interactively by dragging with the new Perspective tool. By turning on Snap To Grid, you can then consistently add an extra dimension to your work.

Manually working to the grid in this way is still a lot of effort, however, and if you change your mind about the perspective or positioning of your objects, you might as well start again. That's where FreeHand's perspective system really comes into its

own. Using the Perspective tool you can attach existing 2D objects, such as rectangles and text, to any axis of the grid and they'll automatically be distorted accordingly. Even better, the system is dynamic so that as you move your objects within the grid, their size and shape updates automatically. Using the Alt key you can even automatically create copies of your object, all of which conform to their position within the 3D landscape.

FreeHand 9's second major new drawing feature is the introduction of on-screen enveloping effects. Surprisingly, these transformations are applied via a dedicated toolbar rather than a floating panel or interactive tool. Various presets are provided, such as circle, triangle and starburst, but these are only the beginning. Once a preset has been applied, dragging its defining nodes and control points can quickly customise it. Such a customised envelope can then be saved and applied in future or it can simply be cut and pasted onto other objects.

Both the perspective and enveloping effects are welcome additions to FreeHand 9's general functionality, but neither feature is exactly thrilling. Compared to version 8's major leap forward with the introduction of transparency and other lens effects, FreeHand 9's core drawing power has been allowed to stagnate. More to the point, with the most recent releases of Illustrator, Draw and Canvas pulling out all the stops with features such as gradient meshes, artistic brushes and integrated bitmap and vector capabilities, FreeHand has quickly fallen behind its rivals. An old-fashioned interface is forgivable but outdated functionality is another matter.

Integration with other applications

These days, however, a program is no longer judged purely by its standalone capabilities and this is especially true of the latest FreeHand. Just as important as FreeHand's internal drawing power is its integration both with other programs and with today's print and Web workflows, and these are areas that the latest release focuses on. The most important graphics program for FreeHand to work hand in hand with is Photoshop. A new option in the Export command's Setup dialog allows you to export PSD images with all layers intact - although text is automatically

rasterised rather than remaining editable. For quick and easy integration you can also now simply cut and paste into Photoshop, with selections transferred either as pixels or as paths.

Also improved in version 9 is FreeHand's Acrobat PDF support. Although Acrobat is Adobe's own format, Illustrator is seriously shackled by its single-page restriction, so FreeHand immediately has a huge advantage here being able to both export and import multiple-page PDFs. With Acrobat 4's increasingly important role as a cross-platform pre-press platform this is especially important. FreeHand 9 also offers extensive customisation with control over image compression, colour conversion, Acrobat version as well as the ability to export notes, URLs and, crucially, to embed fonts. Generally, FreeHand's Acrobat support is good although I'd have preferred to see simpler options for targeting Web, desktop and press output, as well as more advanced options such as job ticketing.

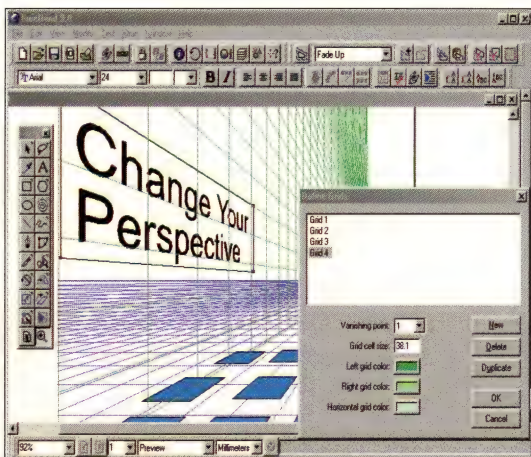
Other than its PDF options, FreeHand's printing



A Objects can now be distorted using on-screen interactive envelopes.

capabilities are left unchanged, but its Web capabilities have been revamped across the board. At the simplest level this comes down to exporting images to the Web-friendly GIF and JPEG formats. By far the most common export format for vector work is GIF, and Macromedia has beefed up its support through the addition of four levels of dithering, an optimise option to remove unused colours from the palette and three WebSnap palettes for 16, 128 and 256 colours. Using these palettes, if a colour is already near to one of the Web-safe colours it's automatically shifted into line, but otherwise it's left unaffected. The WebSnap alternatives certainly provide a useful default compromise between the Web-safe and adaptive colour choices, but even so they're no replacement for FreeHand 9's continuing lack of an export preview or file size feedback. This is even more unforgivable for the JPEG export where quality settings are little more than blind guesses.

Completely new to FreeHand 9 is the Publish as



A The use of Perspective Grids enables drawing with depth.



A FreeHand can now publish as HTML for site storyboarding.

HTML command, though users of the former Design in Motion suite will recognise most of the capabilities from the previous Insta.HTML Xtra. The main dialog simply lets you select pages to output and a browser to see the results in but, using the Setup command or the step-by-step Wizard, you can specify more advanced parameters such as whether to use layers or tables for positioning and what format to output graphics to. The resulting HTML code conforms to Dreamweaver's formatting conventions and can be opened directly into Dreamweaver, but again I was underwhelmed. Basically there are too many rough edges such as the inability to include target frames when specifying URLs and the fact that the new HTML warnings window simply lists problems without taking you to them. FreeHand 9 is fine for basic Web site storyboards but don't plan on using it for producing working sites.

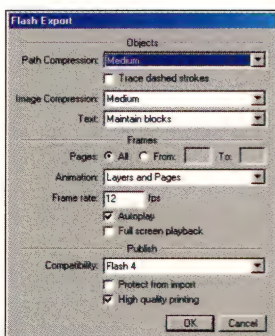
The most powerful Web capability in FreeHand's armoury and its unique selling point is the ability to output images directly to the Flash SWF format. The vector nature of SWF has huge advantages in terms of download size compared to GIF and, with the Flash player's ever-increasing market penetration, browser support is less of an issue. To produce the Flash files, the individual vector elements of a page can automatically be exported to SWF via the Publish to HTML command, but you get far more control if you export a layout directly. The Export Flash dialog offers control over path and image compression, text handling and Flash version along with new control over full-screen playback and protection from import.

Of course the real benefit of the Flash format comes through animation. FreeHand 9 is able to bring static pages alive by

mapping layers onto frames. By positioning two copies of an object and then blending to create intermediate copies, the Release to Layers command can be used to move each blend object to its own layer and, on export, this will produce the effect of motion. New Build, Drop and Trail options in the Release to Layers dialog enable variations on this effect by adding or removing objects on each layer. With version 9 you can also now move grouped elements to their own layers according to stacking order or release the individual letters from a line of text. Putting the new features together you can quickly create the common effect

seen in banner adverts of text being typed on-screen by simply selecting a line of text and the Release to Layers command's Build option.

There's a problem with FreeHand's cell-based animation, however, as its repetition of identical elements on every frame is very inefficient. This is where FreeHand 9's new symbol handling comes in. By converting an object or group to a symbol it can be used as many times as you want with virtually no addition to the final file size. In fact, improved SWF efficiency is only one of the many benefits of symbols. In particular, it's simple to store repeated elements for later reuse simply by dragging them on and off the new Symbols palette. Even better, libraries of symbols can be imported from any FreeHand or Flash file. Best of all, updating the symbol in the symbol palette automatically updates all instances throughout your document. If you have used a navigation bar symbol in a multiple-page site storyboard, for example, you can simply edit one instance's buttons and then drag the new version back onto the Symbols palette and all your pages will automatically be updated.



A Macromedia FreeHand's unique selling point is its ability to output images directly to the Flash SWF format.

The new Flash focus

This is serious Web-oriented power and it brings FreeHand 9 to life. More to the point it makes sense of what Macromedia is really doing with FreeHand 9. Suddenly the various new drawing features are revealed for what they actually are - new Web animation features in disguise. Each of FreeHand 9's main innovations - the perspective grids, envelopes, step and repeat features, even the Magic Wand - comes into its own when creating animations. Suddenly it's clear that Macromedia intends to reposition FreeHand primarily as a Flash-based dynamic Web authoring package, but with the added bonus of a long tradition of high-end

print-oriented graphic design. Even better, that tradition can be leveraged with Macromedia's new drive for print-oriented Flash output to position FreeHand as the only application that you'll need for a complete cross-publishing solution.

In many ways the attractions of FreeHand's move to the Web are compelling - and not just to Macromedia's marketing department. No serious designer can afford to ignore the Web and FreeHand 9's leveraging of Macromedia's existing Web know-how gives FreeHand users a huge advantage when it comes to making the transition. That's undeniably true, but the advent of the Web certainly doesn't spell the end of traditional design and FreeHand's current users will be seriously disappointed at how version 9 has been allowed to fall behind the competition in terms of general graphical creativity. Without a continuous infusion of new graphic design power, FreeHand will end up as little more than a glorified Flash. Or rather, it's in danger of ending up as a seriously underpowered Flash.

Macromedia's repositioning of FreeHand just hasn't gone far enough. Just as with its GIF and HTML output, FreeHand 9 has been left with a number of serious flaws when it comes to creating Flash files. To begin with, despite the new Flash anti-aliased display option, there's no way of previewing animations in situ. Much more serious is the whole layer rather than timeline-based approach to animation. When working on animations, this workaround system is horrendously inflexible, especially when it comes to co-ordinating multiple actions or re-editing. In terms of end results, it's also clumsy with none of the tweening-based efficiency of Flash, let alone interactivity or sound.

Essentially, FreeHand is restricted to producing the simplest of animations and storyboarding and even here its usefulness is limited by the inability to produce Flash's native FLA format files rather than SWF. The obvious conclusion is that if you want to produce Flash you'd be better getting the real thing - a conclusion Macromedia is happy enough to encourage with its Flash 4 FreeHand Studio bundle and bargain upgrade.

Ultimately, FreeHand's move towards the Web does make sense, but it shouldn't be at the cost of general graphic design power and needs to be better thought through than this. FreeHand deserves far better than to become just an add-on, or worse merely a stepping-stone to Flash.

Tom Arah

PC AUTHORITY

EASE OF USE	888888
FEATURES	888888
VALUE FOR MONEY	888888
OVERALL	888888

CorelDRAW 9 Office Edition

GRAPHICS



Verdict A useful addition to any office suite, CorelDRAW 9 Office Edition offers businesses the

benefits of some powerful graphics tools lurking behind a project-oriented interface.

Price \$599

Supplier Corel Corporation 1800 658 850

Internet www.corel.com/draw9office/

Availability Now

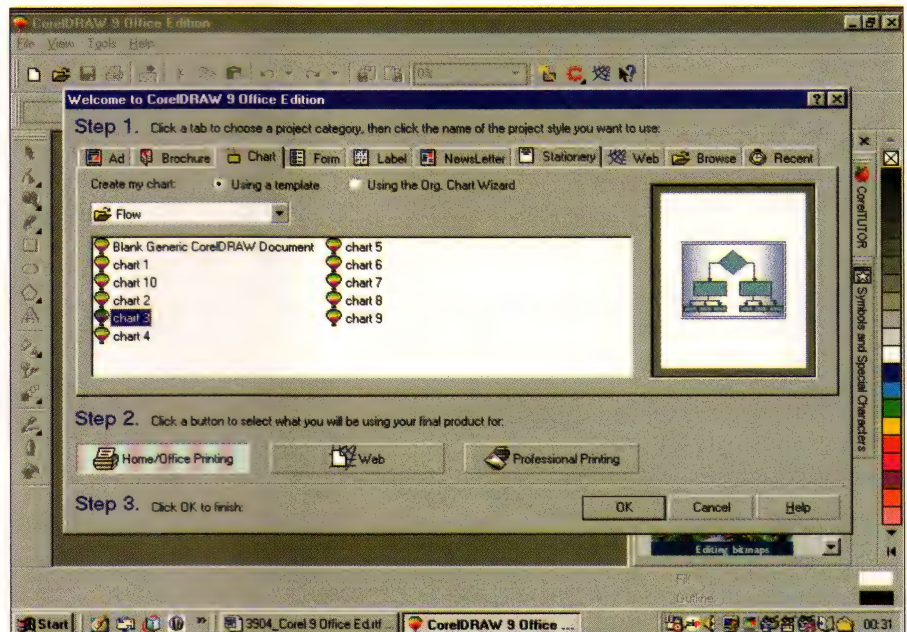
System requirements Pentium/133 or higher, 32Mb of RAM, 150Mb of hard disk space, Windows 9x/2000 or NT 4.

Yes, you're right, it was only recently that we reviewed CorelDRAW 9 - November, in fact. But this is CorelDRAW 9 Office Edition and it's aimed, says Corel, at a very different market from the previous Graphics Suite. Whereas the latter was aimed at graphics professionals, the Office Edition (OE) is designed for small- to medium-sized businesses that are looking for more graphics capability, including those with no previous graphics expertise. Corel reckons that its typical profile ranges from individual companies with, say, fewer than 50 employees, to marketing-oriented departments within larger organisations.

Compared with the Graphics Suite, OE leaves out the full Photo-Paint 9 program, instead including an easier to use 'streamlined' Bitmap Editor. This is an editing tool that lets you edit, enhance, and apply special effects to bitmap images before adding them to your CorelDRAW 9 OE projects. It's also a painting tool, with a range of effects to transform your images into watercolours, oil pastels, felt drawings and chalk sketches, among others.

Nor does OE include the full professional output capabilities such as colour separations, imposition layout, image down-sampling control and trapping. What it does have is a simplified user interface to help novice computer users learn the rudiments of the application more quickly and easily. This is manifested immediately in the first welcome screen, which offers some preset project categories complete with samples. It also has an organisational chart Wizard and flow chart creation tools. Another useful Wizard is OE's Publish to PDF. PDF is the multiple-platform file format used by Adobe's Acrobat Reader and so can get your message to a wider audience more easily. Finally, CorelTUTOR can hold your hand through the complete design process.

A refugee from Corel's WordPerfect Office suite, Corel Presentations 9 is a graphics and slide show generator with which you can create



CorelDRAW's project-oriented interface gets you up and running straight away.

all manner of project proposals, interactive demonstrations and reports, multimedia presentations, flyers, signs, and banners, not to mention Web pages - you'll need Internet access to make full use of this product. There are enough layouts and templates here to enable you to make polished presentations without devoting time to creative agonising.

Corel must have the world's biggest collection of clip-art and some of it turns up here. It claims to be business-specific, though some images are less specific than others. It's also in Corel's own format, which means it's largely unusable except within Corel's programs. You do get a thick paperback thumbnail-illustrated catalogue of all the clip-art, photos, templates and Web art, and at last Corel has matched the catalogue names with the file names on the CDs. The catalogue is organised under various categories and the CDs are searchable, making the images easier to use. Altogether, Corel claims 25,000 clip-art images and symbols, 1,000 TrueType fonts (with euro symbols), 500 business-related templates, and 100 high-resolution photos.

Apart from CorelDRAW 9, other application and utility software shared with the Graphics Suite includes Bitstream Font Navigator 3, Corel Capture and Canto Cumulus Desktop. Bitstream Font Navigator 3 promises a quick way to find and install fonts, organise fonts into manageable groups, and view and print font samples. You get some extra fonts installed with CorelDRAW, and there are lots more on the CD. Corel Capture 9 lets you capture on-screen computer images and record on-screen actions

as animation files. You can capture images of the entire screen, individual windows, toolbars, menus, or any rectangular, elliptical, or freehand area you've defined. You can then use these images with your word processor and presentation software.

Not strictly a CorelDRAW-integrated program, Cumulus Desktop LE 4 is a media management system to organise media and graphics files into one or more catalogues so that you can find your images, clip-art, photos, and QuickTime movies more easily. You can annotate every file to make it easier to find and the whole lot can be indexed. The application supports more than 110 file formats, including Adobe Photoshop and QuarkXPress. You get the cut-down version here, which is limited to 5,000 records and two catalogues.

Apart from focusing its functionality, Corel has also targeted the business users quite aggressively with a rather enticing price of \$599 against \$1,299 for the full-blown Graphics Suite. As a business tool, the Office Edition of CorelDRAW 9 is primarily American-oriented, but in all other respects is definitely worth considering if the fuller flavoured versions seem too bloated for you.

James Taylor

PC AUTHORITY

EASE OF USE	000000
FEATURES	000000
VALUE FOR MONEY	000000
OVERALL	000000

Director 8 Shockwave Studio



MULTIMEDIA AUTHORIZING



Verdict A streamlined interface, with new and improved features puts Director in a league of its own when it comes to the delivery of interactive multimedia over the Web - but it isn't for everyone.

Price \$1,895; upgrade from version 7, \$675; upgrade from earlier version, \$895

Supplier Firmware Design (02) 4725 8000

Internet www.firmware.com.au

Availability Now

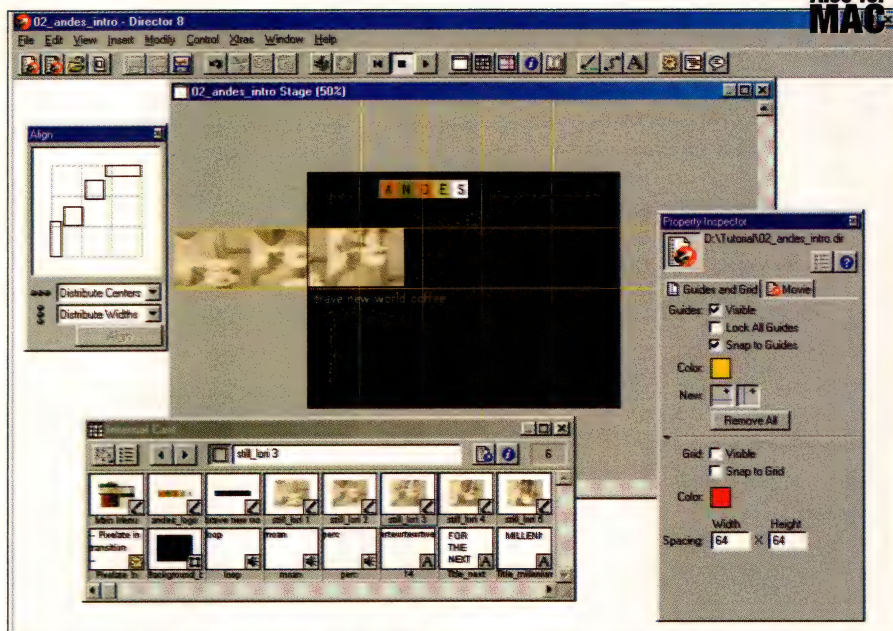
System requirements Pentium/133 or higher, 32Mb of RAM, 100Mb of hard disk space, Windows 95/98/2000 or NT 4.

The world has changed a lot since Macromedia's multimedia flagship, Director, was first launched. Back then the Web simply didn't exist, while today it has become the most important platform for multimedia delivery. Fortunately, with its general Web expertise and especially its Shockwave technology, Macromedia has been perfectly placed to transform Director into a truly Web-oriented application. With Director - unlike FreeHand (see p106) - this transformation has been both complete and convincing, ensuring that the renamed Director 8 Shockwave Studio is now the platform of choice for those sites determined to provide the richest possible Web experience.

Director might be the secret behind the most forward-looking sites on the Web, but you'd never have known it from its own working environment. Director's long past is very evident in its underlying 'theatrical' metaphor where you work with a 'cast' of media elements, a 'stage' where content is viewed, and a 'score' to synchronise your project. Sadly, it isn't just this linear timeline-based approach that's old-fashioned. Over the years, Director's interface has also been allowed to fall behind in crucial areas, while developments have been added piecemeal. The end result was an outdated and inefficient interface that largely disguised Director's underlying power.

Mercifully, with this new release, Macromedia has taken a grip. To begin with it has addressed the most obvious failings. You can now zoom in on the Stage at up to 800 per cent for accurate placement. More importantly, you can zoom out, up to 12 per cent, to leave more on-screen space for scripting. Even better, after zooming out, you can use the new pasteboard to set up animations that start or end off screen. You can also now add guides to the Stage to help placement, while new distribute commands make it easier to position sprites accurately and consistently. When you're happy with a sprite, you can now lock it to prevent accidental changes.

Even more fundamental are the changes to



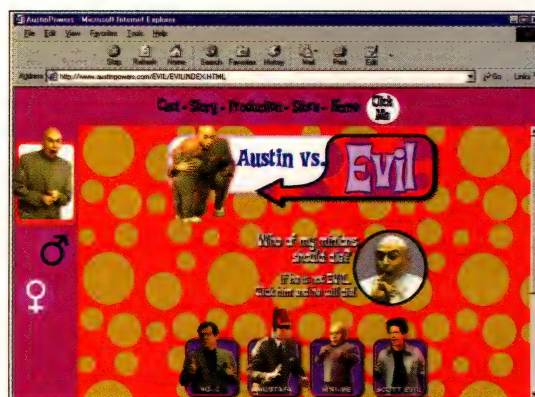
▲ Basic interface features such as zoomed views, guides and a pasteboard have been added.

Director's on-screen palettes. In the past the Cast manager showed all the elements of your projects as icons. That was fine if you only had a few, but it quickly became a nightmare when you were dealing with hundreds. Now there's a List view where items can be quickly located by sorting on name, type, number, creation date and a new customisable comments field. The biggest change of all is the consolidation of a number of former palettes into the new Property Inspector. This offers a huge range of control over the currently selected object through its context-sensitive sprite, behaviour and member tabs and quickly becomes a main centre of work. The Inspector isn't just more efficient it's also more powerful too, enabling shared properties of multiple objects to be updated simultaneously.

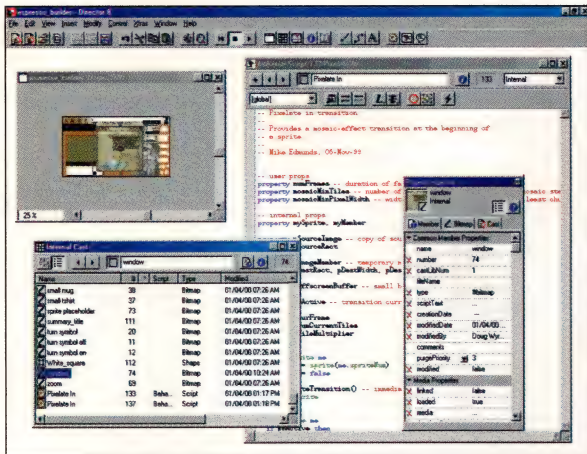
The interface revamp is by no means complete - the behaviour Library is just as awkward as it's always been - but Director does feel far more streamlined in practice. In fact, in many ways Director now feels like a programming environment, especially if you use the Property Inspector's List view to show all parameters as Lingo properties. When working like this, the simple theatrical metaphor seems a long way away, but to make the most of Director you really do have to get to grips with its in-built scripting language, and this is an excellent way of picking up Lingo on the job. Another sign that Macromedia is taking Director's programming responsibilities more seriously is the ability to link to scripts externally. This means that you can use your favourite scripting

environment to work on files, but it really comes into its own when enabling team working with professional version control.

Director might be the nearest thing there is to a multimedia standard, but in recent years it has fallen seriously behind rivals like Dazzler and even PowerPoint, in one of the most important areas of all, impact. The reason is simple. Large bitmaps and visually-rich transitions are by their very nature bandwidth-heavy and don't fit well with Web delivery. Director now offers a partial solution with its new run-time imaging. This gives developers control over the Shockwave rendering engine to enable graphic generation and various on-screen effects at the client end. Best of all, many of the transition effects can be applied on an individual sprite rather than full frame basis. Director 8 projects still don't have the highest production values, but the new imaging Logo commands and



▲ Unbelievably rich content considering the bandwidth limitations of Web delivery.

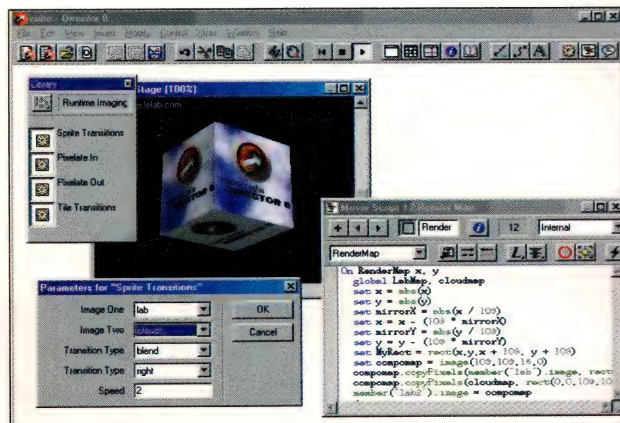


A Viewing Lingo parameters in the Property Inspector makes it a more professional programming domain.

behaviours do enable a richer visual experience within the bandwidth constraints of the Web.

Another area that was previously limited by the restrictions of Web delivery, and that Director 8 now addresses, is sound. Director 8 now supports the import of AIFF, WAV, SND as well as the all-important streaming MP3. By using the new sound Lingo commands and behaviours you can mix, pan, seek, and pause multiple sounds. More importantly, you can cue and simultaneously start sounds with millisecond accuracy and control loop points dynamically at run-time. Putting this together you can create seriously impressive immersive sound effects where the volume and panning of a sprite's audio change as the end user drags it around their screen. The process is labour-intensive and the end results aren't state of the art, but Director 8 does raise the ceiling if not the roof.

When you've assembled and orchestrated all of the elements of your project, you're ready to publish it. As always you can produce a standalone Windows-only projector EXE for delivery on CD-ROM, but the main emphasis is on universal Web



A Director 8 offers run-time imaging controls to improve the end user's visual experience.

delivery through Shockwave. To enable this Director 8 provides an entirely new Publish Settings command that takes care of producing the necessary code through the use of customisable HTML templates, including a new option that displays a 'loader' movie to provide some content while a larger project is preparing to play. To help keep bandwidth demands to a minimum, all bitmap media in the project can be JPEG compressed to a customisable quality setting. Alternatively, you can use the optimise function of the bundled Fireworks 3 (Recommended, issue 29, p112) to

fine-tune bitmaps individually.

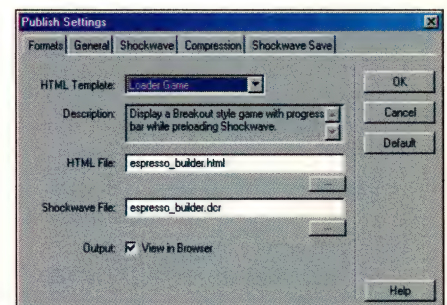
By this stage it's clear that Director's success depends almost entirely on its one unique selling point, its use of Shockwave as a delivery mechanism. Shockwave is undoubtedly Director's greatest strength but it's also its greatest weakness. To begin with, it immediately means that if you're only interested in producing CD-ROM and kiosk projects you'd be better off with another application that doesn't work to restricted bandwidth constraints and so can produce work with greater impact far more easily. Even if you're interested in cross-media work - and these days it's hard to imagine that many users won't be - it's worth pointing out a major issue that Macromedia has tended to obscure: there are actually two Shockwave standards.

Rather than the SWF (Shockwave Flash) files that Flash and FreeHand produce - and an increasing number of other developers including Corel and Adobe have announced support for - Director produces its own DCR (Shockwave Director) format files. If the end user wants to be

able to view these files, they need the full Shockwave 8 player and not the small Flash player. This immediately restricts your potential audience. While Macromedia now claims that well over 80 per cent of browsers can view Flash content, it doesn't put a percentage on Shockwave - though it does claim an installed base of 108 million users worldwide. Even more importantly, by their nature, most Flash movies can be replaced by an automatically generated animated GIF or image map so that all visitors

will see something even without the Flash player. With the interactive, truly multimedia nature of Director's Shockwave productions, there's no fallback - it's all or nothing.

These are certainly serious drawbacks and good reasons to investigate whether the increasingly powerful Flash can give you what you want. For the most compelling and interactive content, however, Flash simply doesn't offer the necessary control and so can't compete with Director. Basically, while a Flash site might impress at the time, you won't forget a well-designed Shockwave site. This is especially the case with the new Shockwave 8 format thanks to two new important capabilities. The first, scalability, allows Shockwave content to scale to fit your browser window rather than being fixed. The second is the new multi-user capability. Director 8 now includes Multiuser Server 2, enabling up to 1,000 simultaneous connections, and rafts of Lingo commands and prewritten behaviours for adding whiteboards, chat rooms and multiplayer games.



A The new Publish Settings command is based on customisable HTML templates.

This move into the multi-user domain represents another leap forward in end user experience and enables Director 8 to deliver the next generation of interactive, multimedia, online communities. For the producer this means that their site will not just be 'sticky', as Macromedia puts it, with visitors returning repeatedly, but also 'magnetic', with visitors actively seeking out Shockwave content and then spreading the word to others. Of course this is the end result that Director really provides - an exploding hit counter and exploding sales. It's just a pity that, in the process, Director 8 Shockwave Studio proves conclusively that there's no gain without pain.

Tom Arah

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Photoshop for the Web

INTERNET



Verdict An in-depth practical manual explaining how to make the most of Photoshop for

producing Web graphics, but the knowledge runs out when it comes to ImageReady.

Price \$59.95

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ISBN 1-56592-641-2

My main reaction to the first 1998 edition of *Photoshop for the Web* was surprise. After all, Photoshop 5 was a print-based photo editor with no dedicated Web features and little to offer apart from the ability to save to JPEG and GIF. It was rather like finding a tome on book-keeping with Microsoft Word - maybe you can do it, but why would you want to?

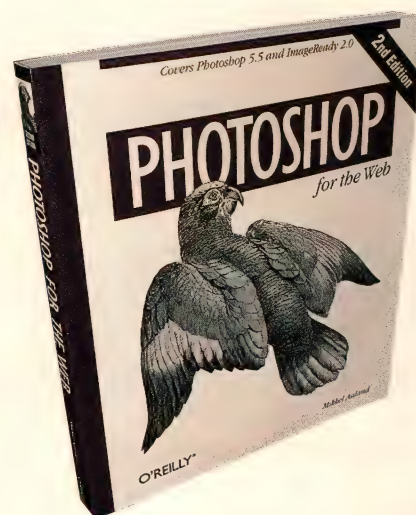
Since then a lot has changed and the latest Photoshop 5.5/ImageReady 2 combination offers serious Web power. The old print bias is still lurking, however, and *Photoshop for the Web*'s first chapter explains just what must be done before the program is truly set up for producing Web work, from switching off ICC profiling through

to changing the default interpolation method.

The origins of this in-depth knowledge lies in the experiences gained by the author, Mikkel Aaland, from swimming against the tide with earlier versions of Photoshop, and the reader benefits greatly from the resulting hard-won practical advice. A typical example is the tip for squeezing a few per cent out of your JPEG file size by first converting to LAB mode, blurring the A and B channels and then converting back to RGB before optimising.

It's clear that no stone has been left unturned to make the most of Photoshop's all-round bitmap power. With dedicated chapters on producing background tiles, type and navigational devices, all featuring illustrated examples from professional designers, this emphasis on first-hand, real-world advice continues throughout the book.

Or rather, it does until the last chapter. Sadly, when it comes to dealing with Photoshop 5.5's dedicated Web add-on, ImageReady 2, the author runs out of inspiration - and apparently even interest. The crucial subjects of HTML tables, image maps and rollovers are all dealt with in a couple of superficial pages. And when someone says, 'I haven't found a GIF animation program that's easier to use than ImageReady,' you know they haven't tried many other programs.



This is a big disappointment, but as ImageReady isn't half the program that Photoshop is, it's perhaps understandable. More importantly, it isn't necessarily fatal. If your needs don't stretch beyond static, standalone Web graphics, Photoshop 5.5 offers everything you need, and Photoshop for the Web will certainly help you make the most of it.

Tom Arah

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DESIGN	000000
CONTENT	000000
VALUE FOR MONEY	000000
OVERALL	000000

Flash 4! Creative Web Animation

INTERNET



Verdict The complete guide to getting productive in Flash 4, with an excellent

accompanying CD-ROM.

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I've always found Macromedia Flash a difficult application to get my brain around, but I was delighted to find that *Flash 4! Creative Web Animation* penetrated my stupidity to such an extent that by the end of this

book the penny had finally dropped.

The book begins gently by affirming your decision to buy Flash 4 and looking at how it's best used to add movement and interactivity to your Web site. Chapters covering drawing, text, sound and bitmaps follow, and these are usually reinforced by the QuickTime tutorials on the accompanying

CD-ROM. Unusually, these tutorials are genuinely useful, showing how to create a complete movie or effect that you can examine in detail by loading the movie scripts themselves.

This combination of text, video and code is an excellent way to make difficult concepts clear; the text itself is full of short examples to try out. It's almost impossible not to understand the procedure by the time you've completed each of the multimedia elements.

The rest of the book continues this approach, tackling the potentially more difficult aspects of Flash including symbols, layers, animation and interactivity. The latter two are particularly challenging, and the number of video tutorials and example movies increase to compensate. What's impressive is that the book takes you from the most basic principles to advanced ActionScripts almost without you noticing.

The book concludes with chapters on testing, publishing and project planning, followed by appendices that list keyboard shortcuts and Web-based resources. Layout is clean with plenty of code fragments and screen shots where necessary, albeit from the Mac version. My only criticism is that the pace is a little slow in the early chapters.



So who should buy this book? If you already have a strong grip of Flash 4, this book has little to offer: it isn't an 'advanced' programming guide. However, if you're new to Flash or, like me, never really grasped it, this book will not only

get you started, it will provide enough information and insight to enable

you to create complex Flash movies with the support of the built-in help. It's certainly vastly superior to the manual that comes with Flash - which is odd as both are published by Macromedia.

Kevin Partner

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DESIGN	000000
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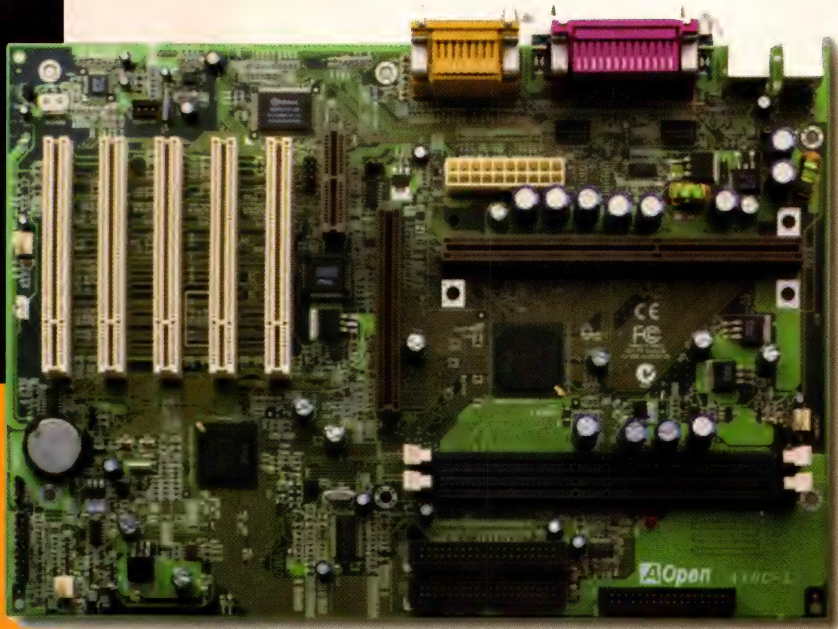
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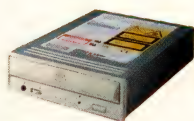
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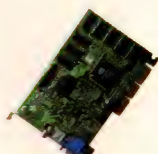
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TECHNOLOGY

Wireless Web

Everyone's talking about it but what does handheld wireless Internet access mean for you? **John Lettice** finds out.

It's the market that everyone's talking about. In Australia, mobile phone penetration has reached a point where almost everyone from teens upwards will have one. But it won't stop there - children are an untapped market, adults will have several, switching them according to fashion and/or functionality, as the wireless data revolution starts to deliver information in all shapes and sizes. Just as ten years ago, being able to carry a phone in your pocket and talk to anybody you wanted was a big deal - likewise the promise of WAP (Wireless Application Protocol), which will allow you to obtain data whenever you want, is going to be a bigger one.

Europe and Australia could find themselves in the driving seat of the mobile data or M-commerce marketplace. This is due to its foresight in introducing a single standard, GSM (Global System for Mobile communications), when wireless phones switched from analog to digital. The US, however, has taken the decision to 'let the market decide' between three competing technologies: GSM, the weakest; CDMA (Code Division Multiple Access), which is viewed as the technological rival to GSM; and the digital leader in the US, TDMA (Time Division Multiple Access) - a near relation to GSM, but by no means identical.

The upshot of having a European standard is that European-based companies have a broader customer base and, as such, more cash flow to spend on

innovations like WAP. A single standard also makes rollout more straightforward. Hence, European-based companies such as BT Cellnet, Orange, Nokia and Ericsson have already started to ship WAP-enabled phones, while cash-strapped US providers are still bogged down in network build-out.

So what does the wireless revolution mean? At the moment it's virtually impossible to predict the full implications, but in order to get a clearer grasp of the direction in which we'll be going it's important to nail one canard. Regardless of the media hype, it isn't about putting the Internet in your pocket, well not exactly.

What we're more likely to be presented with is a similar situation to before the commercial birth of the Internet, when many found it difficult to see why 'ordinary people' would want or need Web access. The answers will be the same: so that they can shop, pay bills, bank and so on. Basically, end users want the Internet because it provides information and services they need to make their lives and work easier. This clearly applies when you switch to wireless Internet, because people will want to do these things when they're moving around. But that's where the 'Web in your pocket' viewpoint starts to get in the way, because you clearly can't fit desktop browsing functionality into your pocket.

Internet in your pocket

There are three proposed near-term fixes for this: GPRS, WAP and XML. GPRS (General Packet Radio

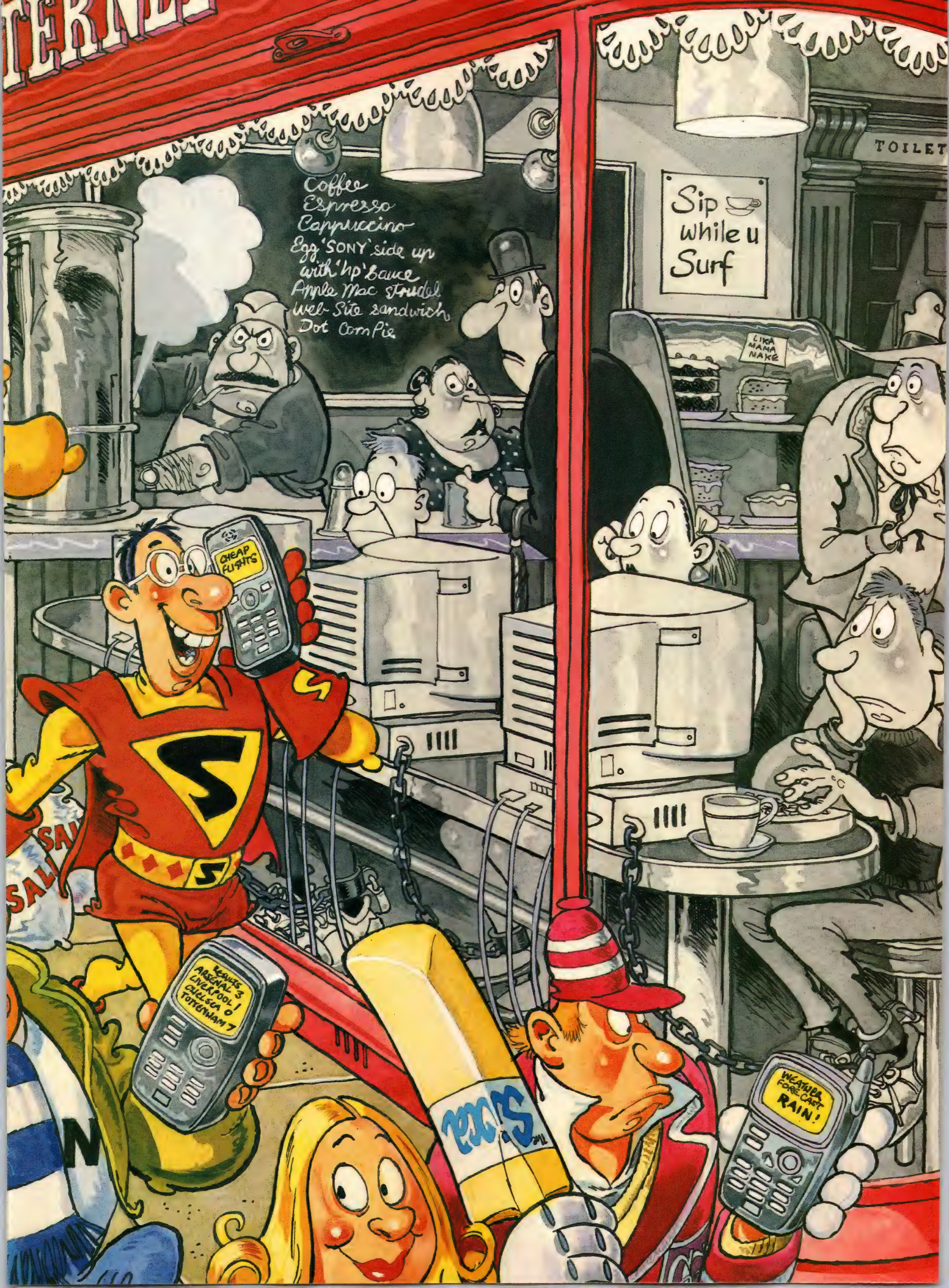


Graham Thompson

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Service) isn't a cure-all, but it will be of importance to the early adopters - people using mobile data via Nokia Communicator type devices, a Psion, PalmPilot, CE device or notebook computer with a mobile phone. Current GSM networks only support 9,600Kbits/sec data connections, whereas GPRS, which is effectively an 'add-on' data network to GSM, will give 115Kbits/sec.

So if you habitually have a device with a reasonable amount of screen real estate and sufficient oomph to be able to load the

pages, then yes, GPRS is nirvana, and lets you carry the Web around in your pocket. However, most people won't want to carry this kind of setup around all the time, or they won't want to be bothered with a computer-like, browser-based interface to access wireless information, or they simply won't be able to afford it. So they need to be given easy access to data on a smaller footprint, a cheap appliance like today's mobile phones.

This is where WAP comes in. To some extent WAP and GPRS are complimentary; GPRS increases the available bandwidth, while WAP reduces the amount of data you need to transfer, presenting it in a format that's appropriate for a small screen. So people using PDAs might find WAP browsers helpful when it comes to more efficient use of screen real estate, while GPRS bandwidth will help to increase the functionality of WAP-enabled phones.

WAP has its origins in the HDML (Handheld Device Mark-up Language) produced by Unwired Planet - now called Phone.com - so you can think of WAP's WML (Wireless Mark-up Language) as an equivalent to HTML, designed specifically for producing Web pages for mobile

devices. XML is involved too, because WML is a language specified as an XML document type. In its Unwired Planet incarnation, Phone.com founded the WAP Forum with Nokia, Ericsson and Motorola over two years ago, and WAP specifications have been in the works ever since.

However, it's only this year that WAP-enabled handsets have become available, and these are likely to remain 'early adopter' hardware for some time yet, not least because version 1.2 of the WAP spec, due later this year, looks set to make most of them obsolete. Significantly, although WAP-enabled handsets are creeping into the market now, the WAP Forum predicts there will be 'tens of millions of WAP-browser enabled products... by the end of 2000'. Which probably means real take-off in 2001.

WAP is by no means a complete solution as it requires that all of the Web sites you want to visit are either WAP-enabled, or accessed via a WAP Gateway and/or some form of on-the-fly translation system. Depending on how a Web site stores its data and generates its pages, WAP enablement can be a trivial exercise. But most site operators will want to know



Mobile Microsoft

► Microsoft doesn't have to get too religious about the OS that runs on clients.

Microsoft's view of the future boils down to what's good for Microsoft is by definition good for the customers. But in the case of the mobile data market, its thinking is both coherent and persuasive, despite Microsoft's failure to announce any wireless mega-deals, although at the time of writing it was hoping to announce several.

Microsoft was initially a WAP agnostic, and although this might seem to be a case of 'Not Invented Here,' there's good justification for it being a lukewarm WAP supporter today. Most of today's Web isn't WAP-enabled, and we've no idea how much, or how little, will be accessible via WAP handsets. So WAP on its own can't be seen as a cure-all, and even in the unlikely event of the entire Web being WAP-enabled in a few years' time, until then there will be a need for other solutions. More bandwidth is a credible solution for PDA-type devices, and WAP will help where it exists.

What about the client side? Late last year,

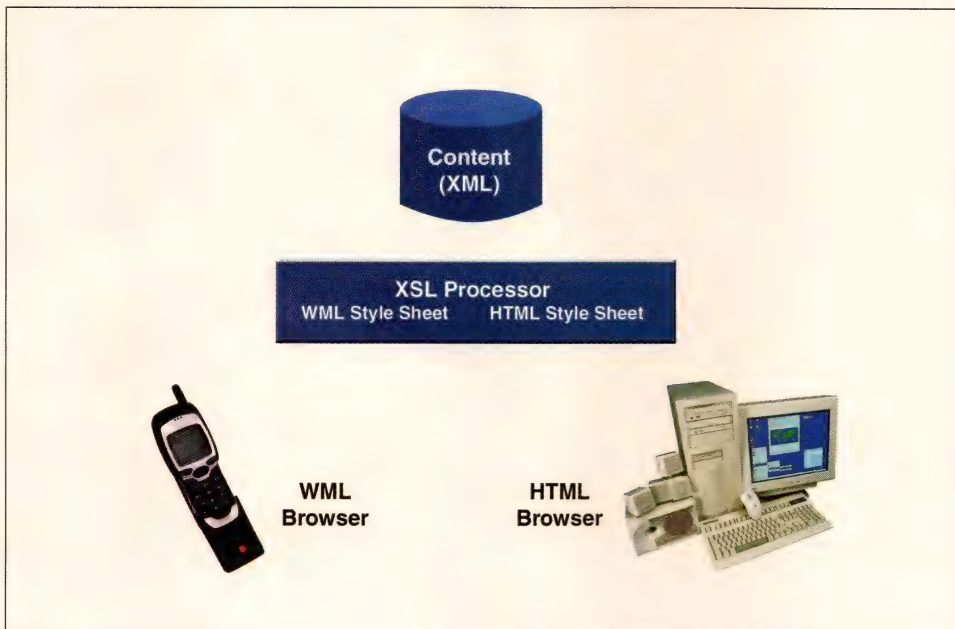
Microsoft stopped giving the impression that it wanted everything that didn't run NT or Windows 2000 to run Windows CE, and announced Mobile Explorer, a micro-browser for mobile phones. As the mobile phone manufacturers no doubt told Bill Gates, mobile phone OSes have to be cheap and real-time. So the smart move for Microsoft was to buy in a micro-browser from another company and start offering it on mobile phones that used other people's OSes. The company's Mobile Explorer deal with Ericsson is an example of this, and Ericsson itself, a Symbian partner, is of the view that Mobile Explorer could turn up on future Ericsson devices using Symbian's EPOC OS.

We can get a further clue as to the direction of Microsoft's thinking by considering the Digital Dashboard/XML strategy it announced last year. This was aimed at the mobile market under the tag, 'knowledge workers without limits,' but while at first glance it looked like an opportunity for Bill Gates to do one of his gosh-wow demos,

there was more to it than that.

Think of a Digital Dashboard as being a combination of browser and Outlook that allows you to specify the pieces of information you want to keep track of, and which then continuously monitors the changing state of that data. Pick your data - company share price, production figures, holiday rotas, whatever you like. From Microsoft's point of view the pay-off here is that this data, it hopes, will be handled by Microsoft server software, and so long as it can achieve this the company doesn't have to get too religious about the OS that runs on clients.





where the customers are before they go for it. If, for example, you store your data on a database and then generate HTML from that, generating WAP pages is a similar procedure. But why bother? There aren't that many WAP handsets out there. If you rely on ads for your revenue, you can't count WAP users because they don't get the ads, and it isn't entirely clear what data people are going to want to get via WAP-enabled phones.

It's probably possible to figure out the data people will find useful, but it will certainly be different in format, and quite possibly different in nature, from the kind of Web data they currently get via PC footprint devices. For example, think about news. In written variety it's most accessible via a conventional newspaper, but there are also roles for Web-based papers. These are obviously different in format from conventional newspapers, and are less usable in general, but in Australia you can get the San Jose Mercury on the Web, while you can't get it at the newsagent.

Other important characteristics of Web-based news are that items tend to be shorter, more immediate, and most commonly produced on a rolling 24-hour basis rather than in specific dated packets, like normal newspapers and magazines. However, it still tends to be a browsing medium - users will look at their favourite sites at regular intervals, looking for items that catch their attention and keeping up to date on subjects they need to know about.

Can that work on a mobile phone screen, even on one of the larger ones that WAP phones will sport? Probably not - even the cutest of WAP page designs wouldn't fit

more than three or four headlines on the screen at the same time, and that just about knocks the browsing model on the head.

Although we've taken picking up news as the example, the situation will be similar for other Web-based activities. Basically, you're going to have to be pretty desperate to try to do your grocery shopping or buy a CD via a WAP handset. This, however, means that services will need to be supplied and used differently, or the whole exercise is pointless.

Short message solution?

Today's more promising short-term solutions don't use WAP or the Internet at all. Some users need to keep track of news minute by minute; for example, city brokers. Certain mobile phone companies are therefore already supplying this via GSM's existing SMS (Short Message System).

SMS is a GSM facility that's similar to pager services; it uses a narrow pipe but it's available as a continuous connection. This can be used to supply headlines and short news items, and users can specify the information they want. Vodafone customers, for example, can even subscribe to various news services via www.vodafone.net. It's also possible to set up a vodafone.net email account, and have 'you have mail' alerts sent to your handset via SMS.

Some phone companies, more interestingly, are taking the idea of having commercials SMSed to you when, say, you walk past a pub that's paid for the privilege. This is less obviously beneficial from the customer's point of view and it's surely only a matter of time before the service

providers bombard us all with unwanted promotional email. Nevertheless, it's a step in the right direction as customers are being offered a limited range of services that are appropriate to the device's footprint and available bandwidth.

SMS represents one of the core differences between US digital mobile systems and European ones. Pager systems have always been far more popular in the US, and because they were seen as two separate systems, there wasn't a perceived need for SMS in the States. The US implementation of GSM includes SMS, but TDMA doesn't. Again, this is likely to give European service providers a lead in developing new subscriber services because they can combine existing technology with newer technologies.

The SMS example is a useful pointer to the kinds of services that will be developed, because at the moment it shows how a ubiquitous, always-on service can be used to deliver small, phone-sized packets of data. And because practically all handsets these days are SMS-enabled, we can view these services as pointers to what future services will look like. The transition to GPRS and WAP-based services will give users the whole Internet to play with. However, for reasons we've already touched upon, there's likely to be a greater emphasis on push rather than pull, with the user pre-selecting the data they want.

Service providers here could turn out to be a far broader category than just the network companies, because although the latter are positioning themselves as big-time content providers, Web site operators also have the opportunity to jump on the bandwagon. For



And the winner is...

DIAMOND VIEW

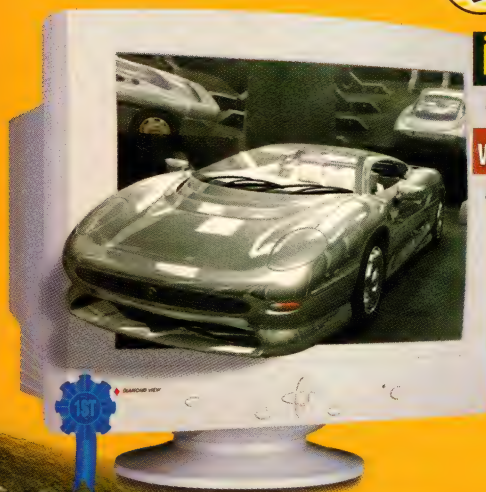
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example, it's the final whistle at the Sydney Football Stadium, so my sports site pushes the result across to the subscribers who've said they're interested in such things. Or, I operate a rolling 24 x 7 news site so I can push headlines to handsets as they go up on the site, maybe tailoring the ones that get pushed in accordance with specific user profiles. In both cases, you'd expect your customers to check for more detail later via a bigger screen.

This kind of approach will ultimately blur the boundaries between push and pull. If you're physically sending data to customers, that's obviously push technology, but if a customer sets up a template or personal profile that regularly updates data they've pre-selected, that's more a case of pull, isn't it? Or maybe it's somewhere in between.

At this point, the importance of XML should become clearer. We've already noted that small footprint devices can't provide the same Web browsing model we're familiar with today, how simply converting HTML pages to WAP won't work; and how information viewed via these devices has to be pre-selected to an extent. So you could view XML as a next stage, which makes it possible for the browser to go away, and for the data the user wants, from anywhere on the Web, to be displayed locally in the most appropriate format.

Client, conflict and the battle for the OS

On the client side there's been a war raging between the Symbian alliance, comprising Psion, Nokia and Motorola among others, and Microsoft. Overall, this will probably turn out to be less important than it at first seems. In order to get things into perspective, just think about the total number of digital phone handsets in the world, then ask yourself how many of these are likely to include the computer-like functionality of a Psion or a Windows CE device.

The handset companies understand this, and know that they need to add data functionality to all of the handsets they ship, while at the same time keeping the price down. From their perspective, the Symbian-CE sector is just a small proportion of the market. It will obviously grow as people find more uses for connected communicator devices, but it won't be the main event for many years, if at all.

Although Microsoft has been trying hard to carve out a role for CE in the wireless market, it hasn't been successful so far. It's been involved in



Standard conflicts

WAP is a worldwide standard, supported by almost everyone, and as it has nothing to do with the transportation mechanism it won't be directly involved in the ongoing wireless standards wars. This isn't, however, the case with SMS and GPRS.

SMS is available via GSM and CDMA, but not via TDMA, so although dual- and triple-standard handsets are coming onto the market, systems set up to use interaction between, say, SMS and WAP browsing won't work if you're using a dual standard GSM/TDMA phone on a TDMA network. GPRS on the other hand will be supported by TDMA, making a dual-standard handset a boon. Superficially it might seem smarter for an Australian traveller to use a dual handset that supported European and US GSM, but while that will give you compatibility, TDMA's coverage in the US is a lot wider than GSM's.

The current wireless standards wars are likely to be repeated as the industry moves over to third-generation (3G) wireless, because although there have been efforts to define a single, global standard via the ITU (International Telecommunications

▶ **Nokia has already unveiled its WAP client.**

Union), it currently looks as if Europe and Japan will go first (Europe has already defined UMTS as its standard, and is going ahead with licence allocations), and US companies will bring up the rear again, squabbling and complaining to the Federal Communications Commission.

For the user, this isn't a big deal. 3G systems will start to deploy within a few years, but initially they'll be add-ons to existing systems, and their fabled broadband capabilities won't be available in real life until the networks are more mature. Increased bandwidth via GPRS will fill the gap, and although the networks will be different in different parts of the world, multiband handsets will make this pretty transparent to the user.



development deals with French manufacturer Sagem and Korea's Samsung to produce Web-enabled CE-based phones, and it's also been piloting a service for businesses in conjunction with a telecommunications company. The objectives of the pilot are relatively modest, but make sense - client devices use a wireless connection to operate as mobile extensions of the corporate network, so workers can get to their Exchange mail and BackOffice services from anywhere. In areas like this, Microsoft can therefore leverage its strength in networking, provided of course that the customer companies are Microsoft shops.

On the client side, however, Microsoft has been hampered by the fact that CE isn't appropriate as a mobile phone OS, because it isn't real-time, and its computer-style pricing of licences provokes eye-rolling from the handset companies - they're used to low footprint, ultra-low cost embedded and real-time software. This is where the Symbian alliance excels with its EPOC OS, generally deemed more appropriate and more suitably priced. It also made sense because via their investment in Symbian,

Nokia and Ericsson had the opportunity to own and drive the software - with Microsoft they'd be licensed passengers.

Motorola was also a founder member of the Symbian alliance and brought with it the emotional 'baggage' of its semiconductor division. EPOC was initially an ARM operating system, which wasn't an issue for Ericsson and Nokia, but was for Motorola. EPOC was, however, ported to Motorola hardware last year, making it more feasible for Motorola to go ahead with EPOC-based devices.

Regardless of support from the mobile industry and the fact that EPOC lends itself well to small footprint devices, early EPOC-based devices are likely to be more Psion-like than phone-like. Meanwhile, the various intersecting alliances the Symbian shareholders have struck since the company was founded make it clear that they're taking the view that multiple platforms, rather than just the one big winner, will play in this space. Nokia, for example, has a deal with Palm to implement the PalmOS on top of EPOC, while Ericsson has one with Microsoft to ship Microsoft Mobile Explorer with its handsets.



Bluetooth beckons

On the face of it, Bluetooth may not have much to do with the wireless Web, but ergonomic and ease-of-use factors are likely to make it a great enabler. Bluetooth is a robust local connectivity wireless standard, which is to some extent a cable replacement. Ultimately, it's intended to be cheap enough to ship with everything. So what?

Think about it - say you carry a mobile phone and a personal organiser that has a Web capability. Your phone's in your pocket, the organiser's in your bag, so in order to use them together you need to set them alongside one another and use a cable or IrDA connection. But if they've both got Bluetooth, you

can just connect without taking the phone out of your pocket. And if the charging's right for your data bandwidth, you can have the two permanently connected to the Web while you're moving around.

There are other unexpected potential applications. The phone companies were, initially and somewhat confusingly, keen on shipping Bluetooth headsets. You keep the phone in your bag, and it connects via wireless to your headset. This doesn't seem like killer technology, but more recently Ericsson has gone a stage further by planning to ship an MP3 add-on for its handsets. So your phone becomes your personal

stereo, and you can use its Web capability to download music.

Another Bluetooth capability has longer-term implications. The standard allows multiple Bluetooth-enabled devices to connect together in piconets - loose, ad hoc networks that are created when the devices are within range of one another. So ultimately you'd expect your house, your bag, your clothes and all of the offices, shops and streets to be full of Bluetooth devices chattering away to one another. As Internet access will obviously be a part of this setup, you could look at it in two ways. Did the Web disappear, or did it just go everywhere?

Wireless world

Internet-enabled wireless clients are just one part of the picture. For mobile Internet to succeed, companies will need a strategy that also encompasses the network, infrastructure and content. In February this year, Vodafone in Europe, which had previously been taking a pretty relaxed view of the wireless Web, woke up and announced its killer strategy. This wasn't entirely unconnected with the company's need to prove to the shareholders of Germany's Mannesmann that it really knew where the future was at, and could therefore be safely allowed to buy the company - this has since paid dividends.

However, the side effect was of course that Vodafone has presented a detailed picture of how it sees the future. In terms of capitalisation, at least Vodafone is now the biggest wireless company in the world, so its roadmap effectively provides a blueprint of the kinds of wireless data operations we're going to see. Vodafone's list of allies is pretty comprehensive. Its system will be designed, built and managed by IBM, while Sun-Netscape will be supplying i-Planet products. These will give Vodafone customers a 'mobile desktop' capability - basically allowing their stuff to follow them around. Aside from these infrastructure alliances, Vodafone is also said to be teaming up with Nokia, Ericsson and Psion.

Vodafone followed that up, also on the client side, with a Casio deal. Initially, there's less to this than meets the eye, because although the first products will be out this year, these models will simply be

Casio PDAs working with GPRS handsets. Further down the line, the pair intend to co-design colour multimedia wireless palmtops with built-in video cameras and high-quality audio.

On the content side, Vodafone intends to leverage its global customer base to an extent where it could be seen as a content player and/or portal in the same class as AOL. If you're using wireless mobile data while you move around, it's natural to expect your phone service provider to provide the connection wherever you are in the world.

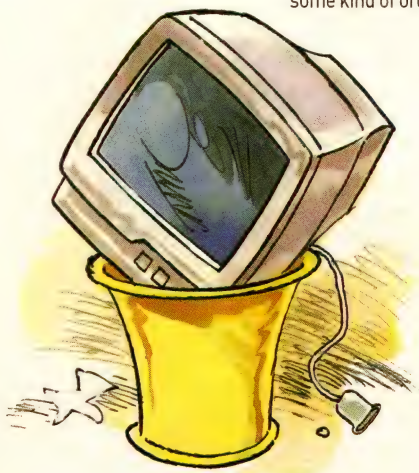
From there it's a short hop for the phone service provider to furnish you with a handset-friendly portal and unified messaging services. People will find themselves connecting from multiple devices in multiple locations, and because of this they'll need mechanisms to keep some kind of order.

Considering the massive advantages operations like Vodafone will have, they're clearly going to be a worry to the likes of AOL. From the customer's perspective, Vodafone's wares will be as you'd expect. It will include news, email, listings information, travel booking and stock transaction facilities - anything in the way of standard content you think mobile users are likely to want is going to be there.

There's another point worth noting here. Due to the restricted nature of the phone handset as a platform, portals set up by Vodafone and similar operators will initially, at least, have greater 'stickiness' than is usual on the Web. Users will tend to go where they're put, largely because their ability to go elsewhere will be limited. Wireless network companies will also have greater resources and expertise in presenting data in a phone-readable form, and they're the ones likely to be spending money on WAP portals.

For now, wireless service providers will therefore have considerable ability to decide what kind of content is presented to customers, and this will represent a spectacular change from the way the Web operates today. Microsoft, we should note, understands the implications of this - why else would it be pushing MSN Mobile Services?

Whichever company wins the fight for client, OS, content or network, there's one guarantee in the mobile world - in a couple of years' time mobile phones won't just be a talking point, they'll also be your point of contact with the Web. **B**

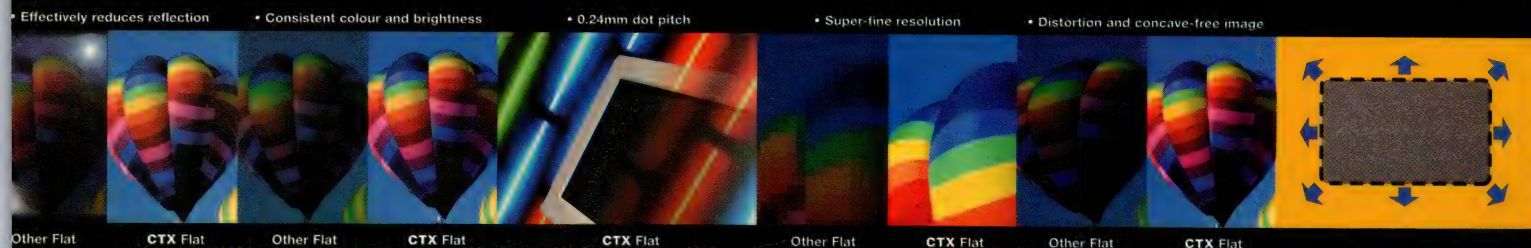


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TECHNOLOGY

Watch the skies!

Space may be the final frontier, but forget sci-fi for a moment because, as **Davey Winder** explains, the science fact is far more impressive.

If you think you've got it bad trying to keep your mail server up and your Web site accessible, spare a thought for NASA (National Aeronautics and Space Administration) and DSN (Deep Space Network). These guys have

the unenviable task of trying to ensure reliable communications with spacecraft whooshing around millions of miles away in space. The DSN is a NASA JPL (Jet Propulsion Laboratory) project, managed by the TMOD (Telecommunications and Mission Operations Directorate), and is the key to keeping in touch with spacecraft launched by various countries around the planet.

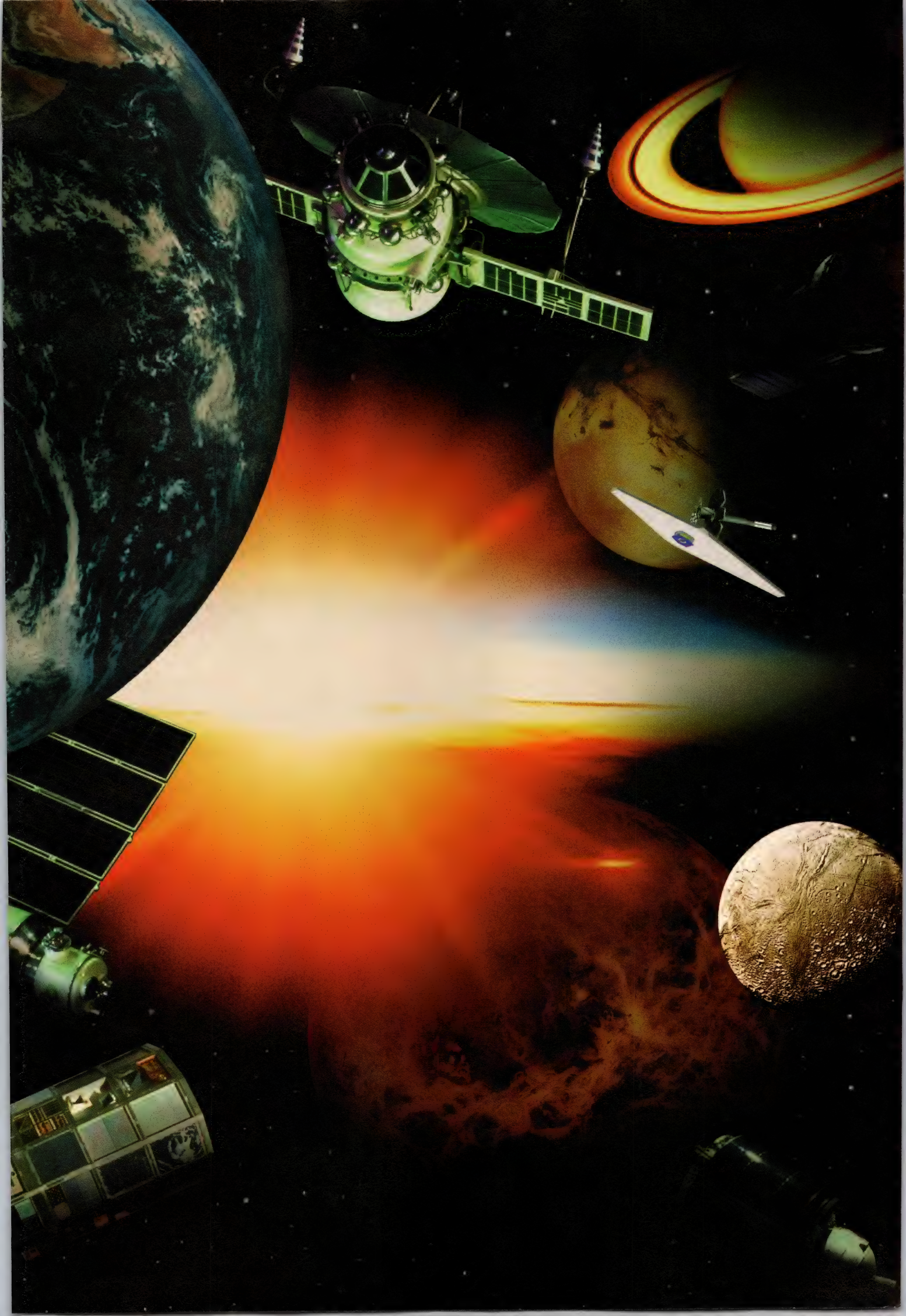
The DSN works by using an international network of antenna clusters situated on three continents. These support interplanetary missions, as well as radio and radar astronomy observations that are used to explore the solar system and the universe. Three deep-space communications facilities are situated at 120-degree intervals around the globe: one at Goldstone in the Californian Mojave Desert, another near Madrid, Spain, and the last just outside Canberra, Australia. Each of the facilities is located within semi-mountainous, 'bowl-shaped' terrain, which shields them from radio frequency interference, and each has at least four deep-space stations equipped with highly sensitive receiver systems and large parabolic dish antennae. The largest, and therefore the most

sensitive, is a 70m-diameter antenna capable of tracking a spacecraft travelling some 16 billion km outside the Earth's orbit. The dish reflector, together with its azimuth-elevation mounts set upon a concrete pedestal, weigh in at a little under 2.7 million kg.

Deep Space Network

The newest antennae are beam waveguide structures. These don't use a centrally mounted feed-horn system like the older antennae (known as high efficiency) they are replacing; instead, their most sensitive electronic components are below ground in a pedestal room. Using a series of precision-machined radio frequency reflective mirrors, the radio signal can be brought down from the reflector into this room, providing easy access for the maintenance crew as well as far more efficient thermal control for the delicate electronics. Perhaps the most valuable advantage of the beam waveguide design lies in its ability to be easily expanded: by locating the electronics in the underground room, it was a relatively simple task to upgrade to such things as the Ka-band frequency requirements of the Saturn explorer Cassini mission, for example.

The ability to array several beam waveguide antennae dramatically improves performance by allowing more of the signal to be captured, and thus enabling higher data rates. Combining the signals of four 34m antennae creates an equivalent capability of a single, but much more expensive, 70m antenna. This



in itself is an important factor as it means there is now a backup mechanism to enable a downtime period on the Goldstone 70m antenna for repair or upgrade, as the 34m array will be able to fulfil DSN tracking commitments.

By strategically locating the antenna clusters at 120-degree intervals, continual observation of spacecraft can be maintained as the Earth rotates, enabling unmanned spacecrafts to receive commands and transmit data to their project managers on Earth. The ability to use unmanned crafts to automate the process of scientifically investigating the solar system is vital to NASA's exploration plans, and the use of DSN in providing the all-important two-way link to control navigation and receive data and imaging is key.

While there's little doubt that these steerable, high-gain, parabolic reflector antenna clusters make the DSN the biggest, most sensitive, scientific telecommunications system in the world, it isn't without its problems. Not least of those is the small matter of available bandwidth on a system that is increasingly becoming overloaded, with 40 active missions fighting for network time each month. Missions that carry a high profile, such as the ill-fated Mars Polar Lander, carry an equally high priority on the DSN network, further reducing the available bandwidth.

As we enter the new millennium, you might be forgiven for assuming that technology is helping to overcome these bandwidth problems, but unfortunately it seems the reverse is true. Since payload restrictions are such that spacecraft space is severely limited, on-board communications equipment has to be compact and lightweight to the extreme. Bearing in mind that DSN communicates with crafts travelling in the furthest reaches of the solar system, and that the aforementioned payload restrictions result in low-power data transmission equipment with the equivalent power of a 20W refrigerator light bulb, you can appreciate why these weak signals require as much as 18 hours a day on the network.

Internet life on Mars

However, three possible solutions are



A 70m antenna at Goldstone, California, forming part of NASA's Deep Space Network communications system.

emerging. The first is the logical reduction of repetitive data transmission, with mission project managers being a lot more thoughtful when it comes to deciding exactly what information needs to be transmitted. The second is to pour more money into developing increasingly autonomous, self-navigating spacecraft, thus reducing the amount of data that needs to be transmitted at all. The third, and most interesting, is to make the change from the current default S-Band (2GHz) and X-Band (8GHz)

frequencies to the higher frequency Ka-Band (32GHz).

Essentially, the higher the frequency, the more data you can move, so the move up to Ka-Band would mean four times as much data transmitted in one-quarter of the time of X-Band. As previously mentioned, the Cassini mission is already using Ka-Band, as was the Mars Polar Lander, but perhaps the less said about that the better.

Unfortunately, there are no plans for its widespread use in the immediate future

because it is harder to use, requiring more accurate tracking and pointing. The lure of being able to cram more missions into the available bandwidth is compelling, though, and the JPL is expected to be making regular use of Ka-Band within the next five years or so.

Being Internet obsessed, as I am, I prefer to think that there could be yet another answer to the problems of future off-planet communications, namely an IPN (Inter-Planetary Net). NASA, together with some impressive names in the network business including the father of the Internet, Vinton Cerf himself, are already working hard to extend the Internet into outer space. Although the timescale isn't exactly imminent, Cerf has been quoted as saying that he hopes a stable interplanetary backbone could be in situ by 2040. It's certainly within sight, with funding coming from both NASA and the DARPA (Defense Advanced Research Projects Agency) 'Next Generation Internet' project. In addition, one has to expect private sector commercial funding to enter the equation, and that combined with the rate of developing technological advance means that the 40-year plan could easily be cut



short by a decade or two in reality.

Indeed, plans are already afoot to wire up the first planet in the network - not surprisingly, that planet will be Mars. A team of scientists and engineers are working at JPL on a scheme to circle Mars with a constellation of navigation satellites, at least six in the first instance, that will act both as a Mars version of a GPS (Global Positioning System) and as communications relays. The hope is that such a system could enable a near-constant communications stream between Earth and Mars at a data rate of an average 11,000bits/sec - fast enough to support the sending of a high-resolution panorama of the planet every day. With the first multipurpose spacecraft that could carry such satellites due for launch in 2003, and missions planned for every two years following, the clock is most definitely ticking.

A perfect example of why communications systems will play such a vital role in achieving this aim was the Mars Pathfinder mission. The atmosphere of Mars meant that only limited sunlight could reach the solar panels of the spacecraft, and therefore produce the power to send signals back to Earth. What's more, the communications signals took some 11 minutes to travel back to this planet, limiting productivity of the mission rover, Sojourner. If Sojourner hit a rock or some other obstacle it would have to wait for further instructions before moving on, a wait that could often take up to a day.

On a 90-day mission, if each of the mission rover's moves took as long as this, it wouldn't take a genius to realise it could soon develop into a logistical nightmare. Indeed, with data being transmitted from Pathfinder to Earth at a rate of just 300bits/sec, the data from a \$US150 million mission would be hard pressed to fill your average desktop PC's hard drive. So the move has to be towards automated, robot-driven missions, and communications technology

will be at the heart of their success. Taking the somewhat broader view, if truly useful interplanetary exploration is something that's to be taken seriously in the future, such a communications infrastructure is imperative.

Space age protocols

The Internet, and to a degree wireless networking developments, are an attractive source of inspiration for NASA engineers. After all, with budget constraints on everyone's minds, if lessons can be learned from existing technologies that prevent potentially expensive mistakes, so much the better. Starting from scratch is always an expensive option, but can Internet protocols and strategies really be launched into space? A cursory look at the practicalities would seem to suggest not, with Mars being some 34.6 million miles away from Earth, at least. The actual distance is changing all the time, and even at the speed of light radio signals will take at least three

the spacecraft, enabling the position and velocity of the craft to be determined.

- A Telemetry System provides the capability to acquire, process and distribute telemetry data from deep-space probes. This data consists of scientific and engineering information, modulated on radio signals transmitted from the spacecraft.
- A Very Long Baseline Interferometry System provides a means of measuring plane of the sky angular positions of radio sources, interstation time and frequency offsets, and Earth orientation parameters.

minutes to arrive, and perhaps as long as 20 minutes. Realistically, the round-trip times are likely to be much longer, allowing for the relative positioning of Earth and Mars around the Sun, and could take anything between 15 and 50 minutes. Latency on this scale just can't work with current Internet protocols, which need to acknowledge safe receipt of data packets or request re-transmission if unsuccessful - such acknowledgements being measured in milliseconds rather than minutes. So with a space speed limit firmly in place, where data is looking at round-trip times in excess of ten minutes, a new set of protocols will need to be developed to link together a cosmic network of Internets.

This isn't as simple a task as it may sound, even in these days of technological advance and network wizardry. Handling the excessive round-trip delays is perhaps the biggest problem, but others such as overcoming the data stream corruption or obscurity when crossing the interplanetary divide caused by background noise are just as tricky. Even the DSN antenna arrays suffer from transmission errors caused by this cosmic interference, and are dealt with by the successful if somewhat brutal method of sending everything twice. The thinking being that by sending everything in duplicate, the odds are stacked high in favour of the same bits of the broadcast not being lost both times. A terrestrial computer then compares both data streams and pieces them together to complete the transmission picture.

There are, it would appear, two schools

DSN capabilities

- A Command System provides the ability to control the activity of the spacecraft. Command data is modulated on the RF carrier and transmitted by a DSN station to the spacecraft itself.
- A Radio Science System provides the ability to perform radio frequency experiments between Earth and spacecraft. Past experiments have enabled characterisation of planetary atmospheres and ionospheres, surfaces and rings as well as determining the mass of planets, moons and asteroids.
- A Radiometric Tracking System provides two-way communication between terrestrial equipment and

▼ Preventing communication breakdowns are vital if mission failures such as the Mars Polar Lander fiasco are to be avoided.

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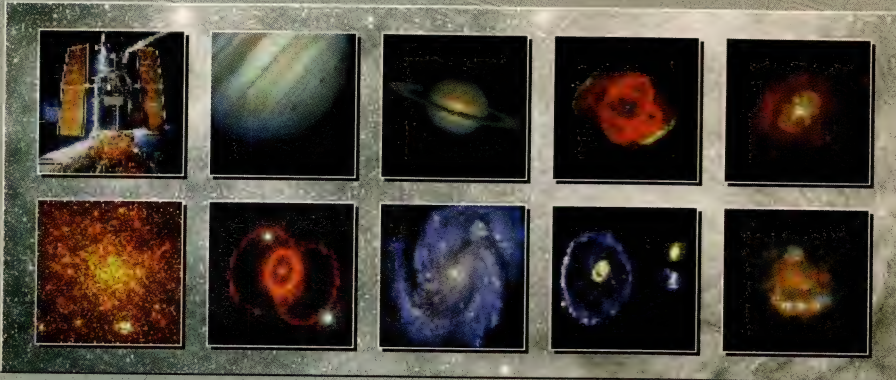
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Hubble Space Telescope Public Pictures




of thought as to the best way forward in developing interplanetary Internet-working protocols. One approach is to use a 'bundle space' model, where instead of using a packet transport system as we're used to with our Earthbound Internet, a single data transaction methodology is implemented. This would involve all the broadcast information being bundled together with the necessary data to process it at the other end. The idea being that each planet that joins the IPN would have a gateway to handle data traffic,

meaning an information bundle could arrive at any such gateway where it would get routed to the next, and onwards slowly to its destination. The DSN could become the default Earth gateway in such a scenario, for example.

But while the DSN may survive in this model, it's likely that the DNS (Domain Name System) wouldn't - at least, not as we know it today. With severe restrictions on bandwidth and memory in space, as already touched upon, it wouldn't be feasible to keep an active and up-to-date name server on each spacecraft. Instead, it's much more likely that it would be up to each gateway to handle the delivery to the final address, with data just being routed to that gateway in the form of earth.sol or mars.sol domains. Indeed, I understand that NASA has already, through JPL, approached the ISO (International Standardisation Organisation) in Geneva to tentatively enquire as to the realities of setting up a 'solarsystem'.sol superdomain for earth.sol and moon.sol. It has been reported that the response boiled down to the requirement of needing a sovereign representative of each planet involved to provide written letters of intent!

The bundle-space approach isn't without its own inherent problems, like getting around the fact that celestial

 Images from Hubble are made available on the Internet in double-quick time.

objects move constantly in relation to each other, so the communication paths will be rather complex, to say the least - unlike security, which couldn't be complex as bundle space isn't an interactive transport medium, so no public key exchange crypto is necessary. Instead, a combination of pre-shared keys and limited access to the network would be the most likely solutions.

The latter is almost certainly going to be the case in any given scenario for a while, as limited bandwidth, cost of implementation and the value of data transmitted all add up to the simple fact that spamming astronaut@station1.moon.sol isn't likely to be an option. It seems to me that ultimately the alternative interplanetary Internet-working protocol methodology, which is being developed by the JPL engineers responsible for standardisation of interplanetary NASA missions, will be more likely to succeed.

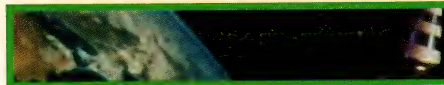
This would involve a packet-based protocol that actively monitors the delivery of data packets and requests missing ones for retransmission, but crucially, and unlike our existing TCP/IP, it also has the ability to keep on running despite an incomplete stream of packets. This protocol would allow for missing packets to be transmitted days later, with no effect on the eventual data assembly and packet processing procedures. This model also does away with the complex address headers that we see in TCP/IP, which consume 500 bits a time, far too big in space data-transmission terms. Instead, a stripped-down header element is being developed that totals a mere two per cent of each data broadcast, which equates to around 48 bits for each header.

Unfortunately, this would mean that the new protocol wouldn't be compatible with the Internet, but that's a small price to pay for the extra data that could be transmitted in each packet. And anyway, Internet compatibility will have to take a backseat in the early days of any Mars Network, perhaps coming into play when Vinton Cerf's IPN starts taking shape some 30 or 40 years down the road. Having said that, JPL foresees a system whereby an additional terrestrial gateway could act as an interpreter between the protocols, allowing NASA scientists to access the network by way of its Internet connections.

Telescopes in space

The HST (Hubble Space Telescope) was first conceived back in the 1940s, designed

'DSN could become the default Earth gateway in such a scenario, for example'



SETI@home

The Search for Extraterrestrial Intelligence (SETI) was originally a US government-backed project that started in 1961. In 1993, the NASA funding was pulled as part of the tightening of budgets. However, all was not lost because various organisations have continued to carry the SETI flag and bring the research into the 21st century. Perhaps the most notable, at least from the IT perspective, is the SETI@home initiative. This is essentially a sky survey listening for interstellar transmissions that may emanate from other life forms. The survey covers a 2.5MHz bandwidth, which is centred at 1,420MHz and encompasses 28 per cent of the sky with declinations ranging from +1 to +35 degrees.

The SETI search makes use of a dedicated L band receiver on the 1,000ft radio telescope at Arecibo Observatory in Puerto Rico, part of the National Astronomy and Ionospheric Centre. This flat-feed cryogenic receiver is mounted on the carriage housing of the telescope and provides a single linear polarisation with a gain of 3K/Jy and



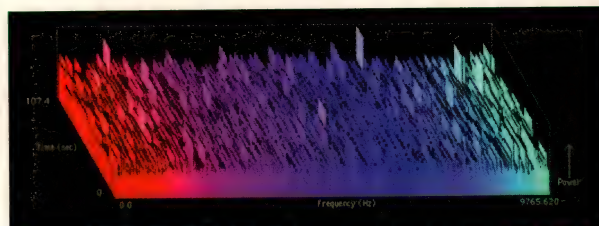
▲ SETI@home brings the search for extra terrestrial life out of the lab and into your PC.

a 0.1-degree beam width. The output is down converted, digitised and converted to baseband resulting in a 2.5MHz band continuously recorded

to 35Gb tape, along with co-ordinates, time and engineering data. A complete sky survey will use some 1,100 tapes, producing a total of 39 terabytes of data for analysis.

This data is transmitted to the University of Berkeley where each 35Gb tape is processed. The 2.5MHz bandwidth data is divided into 256 sub-bands using a 2,048-point FFT (Fast Fourier Transform) and 256 eight-point inverse transforms. This results in 350Kb chunks known as work units, each consisting of 107 seconds of data from a given 9,765Hz sub-band. These work units are then distributed to SETI@home users across the Internet. The users have downloaded client software, which is freely available and acts in screen-saver fashion, with an important difference to most screen savers in that it uses your computer idle time to analyse the signal data. Depending on how much idle time there is on your PC and how powerful it is, each analysis can take anything from a few hours to a few days to complete. Once the analysis is finished, the results are uploaded to Berkeley and a new work unit downloaded to continue the processing cycle.

What the analysis is actually looking for are any interesting signals out of the ordinary. Since nobody knows which bandwidth or timescale would be used by an extra-terrestrial signal, the software searches at 15-octave-spaced



▲ A sample SETI@home frequency time power graph showing the FFTs as they are calculated.

bandwidths from 0.075 to 1,220Hz and timescales between 0.8ms and 13.4 seconds. Alien signals may also experience frequency drift relative to the observatory reference frame, due to their planet rotating and revolving for example, so the SETI@home software looks at 6,761 doppler acceleration frames of rest, known as chirp rates. In essence, what they're looking for are strong and narrow bandwidth signals with a characteristic growth and fade pattern, and it accomplishes this by screening out the space noise and terrestrial interference.

Unfortunately, so far they've only found the test signals they implant themselves to ensure everything is working as it should, and a lot of radio frequency interference from both terrestrial transmitters and satellite sources. However, the search goes on, and as we entered 2000 the SETI@home project had clocked up an impressive tally of 1,564,921 users in 224 countries around the globe who've devoted an amazing total of 148,390 years of CPU usage between them, transmitting 56,053,526 data sets.

and built during the 1970s and 1980s, and finally launched into orbit by the Space Shuttle Discovery on 25 April 1990. Unfortunately, once up there in its LEO (Low Earth Orbit) of 600km, it was discovered that the main mirror in this 2.4m reflecting telescope was incorrectly ground. This spherical aberration meant that the mirror was beaming only a small amount of light from an object into a well-focused core of light, the rest of the light was being diffused into a halo around it. This resulted in blurry imaging and in a lack of available light for the other scientific instruments that needed it. A repair and servicing mission in 1993, and another in 1997, fixed these problems and resulted in the eighth

wonder 'off' the world.

Hubble has three cameras, two spectrographs and a host of fine guidance sensors. By combining them all above the Earth's atmosphere it can produce high-resolution images of astronomical objects of the quality that terrestrial telescopes just can't equal. At the heart of the Hubble is the Optical Telescope Assembly, the Hubble mirror. A standard Cassegrain telescope sees light enter the tube from an object and bounce from a primary to a secondary mirror, the latter sending the light back through a hole in the primary mirror, which focuses onto an imaginary surface, the focal plane in other words. The Hubble uses an adapted version of

the Cassegrain telescope, which provides light in the focal plane that's as close to the diffraction limit, as specified by the laws of physics, as possible. The Hubble mirror can concentrate 84 per cent of incoming light into a small dot of encircled light energy on the focal plane, the diffraction limit of the mirror, thus providing the highest quality resolution of images to the on-board scientific instruments.

The instruments carried by Hubble are impressive pieces of technology in themselves, especially the WF/PC (Wide Field and Planetary Camera), which has provided the most visually stunning images of the universe, such as clusters of remote galaxies and near

psychedelic imagery of distant nebulae, for example. The WF/PC is mounted behind the main Hubble mirror, perpendicular to the long axis of the telescope, and is not one, but four cameras. An L-shaped trio of CCDs (Charge Coupled Devices) provides a } wide field, while a smaller, high-resolution planetary camera is tucked into the remaining corner of the square space. A full picture of 1,600 x 1,600 pixels across the CCDs is possible, and objects as faint as 28th magnitude can be seen during long-term exposures.

Yet despite its undoubted success, seeing hot matter draining into a black hole and the light of galaxies 10 billion light years from Earth, for example, Hubble is starting to show its age. After all, it only ever had a 15-year life expectancy, so the repair mission in December 1999 to replace the gyroscopes, computer, fine guidance sensor, assorted data recorders and transmitters and more should come as no surprise. However, all this expensive, manned mission achieved was to patch up an ageing spacecraft - there was no element of upgrade here. This is set to happen in 2001 when an ongoing mission to install a host of new instruments is planned, and should boost the telescope's capabilities by more than 25-fold. The ACS (Advanced Camera for Surveys) will be first on board, enhancing the Hubble deep-field capability from tight focus to wide sky surveys to the same depth. Then in 2003 the Cosmic Origins Spectrograph should come into play, exploring the dark matter that accounts for the bulk of the universe's mass.

However, it's 2008 that holds the most promise, for it is then that the much talked about NGST (Next Generation Space Telescope) is set to launch. This will be the Hubble replacement, designed from the ground

up to detect the very

edge of light, and so gaze further back in time than we ever imagined possible, right back to beyond when the first stars and galaxies were formed. Light travels at a finite speed, so the universe is always viewed as it was rather than as it is - the sun is always seen eight



Web links

Deep Space Network

<http://deepspace.jpl.nasa.gov/dsn/>

Hubble Space Telescope Picture Library

<http://oposite.stsci.edu/pubinfo/pictures.html>

NASA

www.nasa.gov

SETI@home

<http://setiathome.ssl.berkeley.edu>

Space Telescope Science Institute

www.stsci.edu

Teledesic

www.teledesic.com

minutes old, for example. Hubble can see back as far as 40 per cent of the total age of the universe, or around five billion years ago (compared to about two billion before the telescope was launched).

Hubble has gone right back to between ten and 11 billion years ago using a technique known as gravitational lensing. The telescope captured an 'Einstein Ring' optical effect, caused by a distant light source being directly behind a galaxy as seen from Earth, and by using the galaxy in the middle as a gravitational lens, as predicted by Albert Einstein himself. Since the middle galaxy bends the rays of light from the object, the distant observer (Hubble) sees a halo with the galactic lens in the centre. The object in this case is said to be another galaxy, and it was the first unbroken Einstein Ring seen. NGST will be based around an 8m mirror, compared to Hubble's 2.4m mirror, and will provide a light-collecting area that is ten times larger and optimised to record wavelengths further into infrared than Hubble can muster (because the expansion of the universe moves light from distant objects to the longer 'redder' wavelengths). This will provide the ability to get close to the very beginning of time, as far as

'the distant

observer

(Hubble) sees

a halo with the


galactic lens in


the centre'

when matter unleashed by the Big Bang had cooled but not begun merging together into stars.

NGST isn't without problems of its own, not least the cost as NASA enters a period of insecurity regarding long-term funding, and technical issues such as the degree of coldness required to maintain optimum sensitivity for infrared light. This latter problem is thought to be solvable, ironically, by an orbit around the sun. Away from the heat of Earth and the moon, shielded from sunlight itself, this could provide both cold temperature and longevity of the mission. The small matter of funding, limited to around \$500 million (a quarter of the cost to build and launch Hubble), is being addressed by planned use of an unmanned and expendable launch vehicle instead of the Space Shuttle. Whether this whittles the cost down enough remains to be seen.

What the future holds

Assuming that all goes to plan, we'll see the first of the Mars Network communications satellites hitching a ride on the 2003 mission spacecraft. By 2005 the technologies should be mature enough to allow IPN protocols to be operational for Mars lander missions and could be followed two years later by a robotic presence of some kind, communicating with Earth using IPN protocols. By 2010 we could see a relay satellite in stationary orbit (relative to the planet) 10,625 miles above Mars, which could be used to increase data throughput to 1Mbytes/sec. Between 2020 and 2040 the Interplanetary Network will be a reality, providing interstellar Internet communications. One thing is for sure, the future's bright, the future is out there... 

 A concept drawing showing just what the NGST might look like.

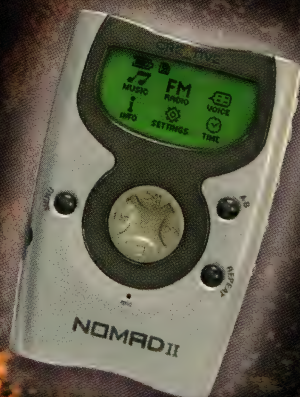


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Outlook Today with knobs on, care of Dash-ing Simon Jones.



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David Moss farewells Borland, and John Honeyball makes his directory Active.



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AOL 5 is an Auto Launch short of a pleasant installation, argues Davey Winder.



GET INVOLVED • If you'd like to share your IT experiences with other *PC Authority* readers, then get in touch. See *Write On* (page 34) for full details.



Questions & Answers

David Moss makes unwanted items disappear from IE 5, gets a taskbar to appear in Outlook and conjures up an Active Desktop.

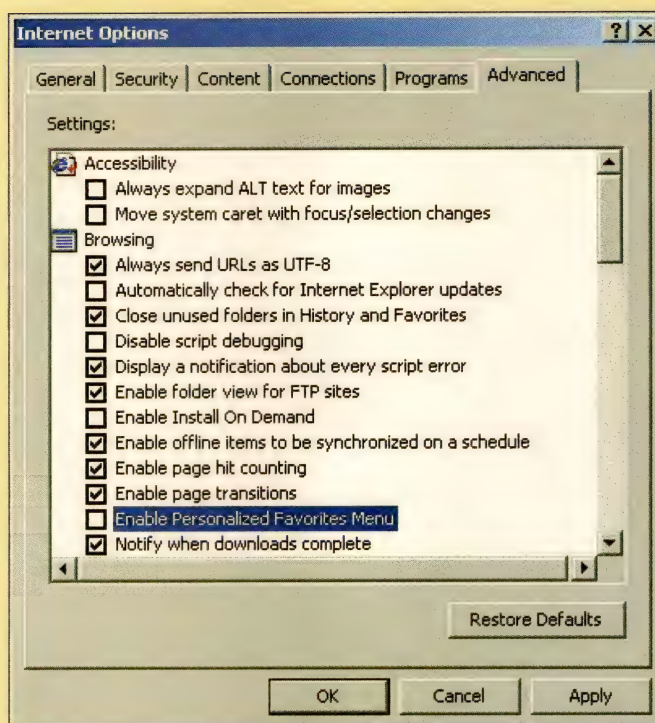
Seeing it all

Q I'm using Internet Explorer 5 at the moment and like it a lot, except for one thing. I can't see how to switch off the feature that stops all items appearing on the Favorites menu. This means I get to see every item, as opposed to the ones I visit most often.

J Marshall

A To switch it off go to the Tools menu, and then select the Internet Options menu item. Click on the Advanced tab when the dialog appears, and look in the Settings window. You'll see an entry under Browsing, labelled Enable Personalised Favorites Menu. Click in the checkbox next to it in order to deselect it. Click on the OK button, and then close down Internet Explorer.

When you next run it, you'll find the full-length Favorites menu, with all the entries on it.



A The value that lets you turn that irritating personalised Favorites menu in IE 5 on and off.

ToggleKeys

Q I've used some DOS commands before, but using the Microsoft Knowledge Base led me to article Q191458 and some things I'd like to understand. My problem was that the ToggleKeys function went all wheezy with a clicking coming from the PC speaker. The speaker was okay, as it beeped during the bootup as always. I find the feature extremely useful because of my dyslexic fingers. I run Windows 95, OSR2 with IE 5, but the fix was for Windows 98. I gave it a shot anyway, and it worked. Could you tell me what's happening?

M Rees

A For those who want to read the article referred to, the full URL is <http://support.microsoft.com/support/kb/articles/Q191/4/58.ASP?LNG=ENG&SA=ALLKB>. It refers to the creation of a batch file called winstart.bat, and the command line that's entered into it to be executed when the system starts:

```
echo ^G
```

That's what you get by following the instructions in the article and typing 'echo' followed by <space> followed by <Alt+7>. That G represents the ASCII code for BEEP0, and the batch file makes the PC speaker issue a beep sound when the system starts up. I can only assume that this action somehow resets your

speaker, which had been partially muted by some code in the ToggleKeys feature. Anyone else have a different opinion?

The winstart.bat file, before anyone asks, is used to load memory-resident programs required only by Windows-based programs.

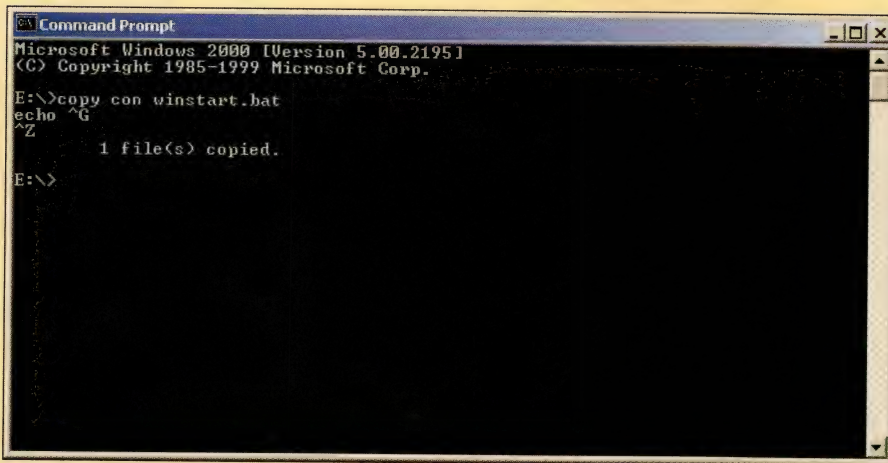
Boot force

Q I've been running my P133, which I bought in 1995, on a SCSI-only machine through an Adaptec AHA2940 PCI card. I've recently acquired an old small IDE hard drive, IBM 42Mb circa 1991, and intended to use it as a backup for important files that are too big to put on 1.44Mb floppy. When I set the new drive as the primary master it becomes the C drive, and I get a message telling me the computer can't find the OS. I can find anything in the SCSI BIOS or system BIOS to make

the computer allocate C to the SCSI hard drive on device 1. Can you help?

J Lee

A The solution lies in your system BIOS, where if you're lucky there will be an entry - probably in the Advanced Settings area - that will let you force it to boot from your SCSI hard disk. If it isn't there, however, there's nothing you can do, short of changing the motherboard and getting a new BIOS. Under normal circumstances, if you have both IDE and SCSI drives in your system, the system will always try to boot from the IDE drive first, and unless you can stop it there's no solution.



A Creating a Beep file restores the PC speaker to full voice.

Missed the post

Q I've installed Windows 95B on a small workgroup network (six computers) and configured Microsoft Mail PostOffice for Windows Messaging and used Microsoft Exchange for emails. This setup has worked for more than a year. Now I'm planning to upgrade Windows 95B to Windows 98 Second Edition. I've installed Windows 98 on a trial system to find out how to set up the same environment - internal emailing system - and I couldn't find a program like Microsoft Mail PostOffice, Windows Messaging system, Microsoft Exchange, or anything similar to set up the internal email system. Could you please advise me on how to set up the above environment using Windows 98?

M Somatillaka

A The reason you can't find anything is because those items aren't installed by default under Windows 98. You can, however, install Windows Messaging by locating its setup programs on the Windows 98 CD-ROM and running it from there. You'll find the program in the following folder:

<CD-ROM Drive>:\tools\oldwin95\message\us\

To install Windows Messaging, double-click on the wms.exe file and follow the Wizard. This will give you Windows Messaging and the Microsoft Mail PostOffice. You'll find that you get an Inbox icon appearing on the Desktop and the Microsoft Mail PostOffice icons in Control Panel. Apparently, if PostOffice is already in place before you upgrade to Windows 98, it will simply be updated. You'll find Microsoft Fax in the same place. Microsoft Fax requires a full MAPI client such as Windows Messaging, Exchange or Outlook to be installed before you can use it. You then run the awfax.exe file and follow the Wizard as usual. Microsoft says that if you do that and you have a Corporate or Workgroup setup Outlook 98 already on your system, you'll need to rerun setup from Add/Remove programs in Control Panel in

order to update Outlook 98's files. There's a text file that should provide you with more information, and you should be able to find it in:

<CD-ROM Drive>:\tools\oldwin95\message\wms-fax.txt

Not a virus

Q I have a problem I think is a virus, but my Norton AntiVirus 5 can't pick it up. Every time I send an email using Outlook 2000, an attachment goes along for the ride. The attachment is called: winmail.dat. If I send an attachment along with my email, winmail.dat corrupts it. If I use Outlook Express to send emails, winmail.dat doesn't go along, it only appears with Outlook 2000. Is this a virus?

B Cattapan

A No, it isn't a virus. The winmail.dat file is used to preserve formatting that your mail client includes in the messages you're trying to send. I assume you're trying to send messages using some format other than plain text, so the winmail.dat file is being attached but the receiving client is incapable of recognising the data you're sending. If you switch to Plain Text format for your messages the problem will go away.

Should you decide to use plain text for all your messages in future, go to the Tools menu,

select the Options menu item and then click on the Mail Format tab. Select Plain Text as the format for your messages at this point, and all will be well.

Another solution is to select the mail format at the time of message creation. You can do this by clicking on the Format menu of the Message window and selecting the Plain Text menu option.

Alternatively, if the message recipient is in your Contacts database, open the Contact form for that recipient and look on the General tab: if you see a checkbox that will let you select Plain Text as the email option, click in it. If not, double-click on the recipient's email address and when the Email Properties dialog appears, clear the checkbox labelled 'Always send to this recipient in Microsoft Outlook rich-text format'.

You might find a Microsoft Knowledge Base article Q241538 of interest, and the URL is <http://support.microsoft.com/support/kb/articles/Q241/5/38.ASP?LNG=ENG&SA=ALLKB>

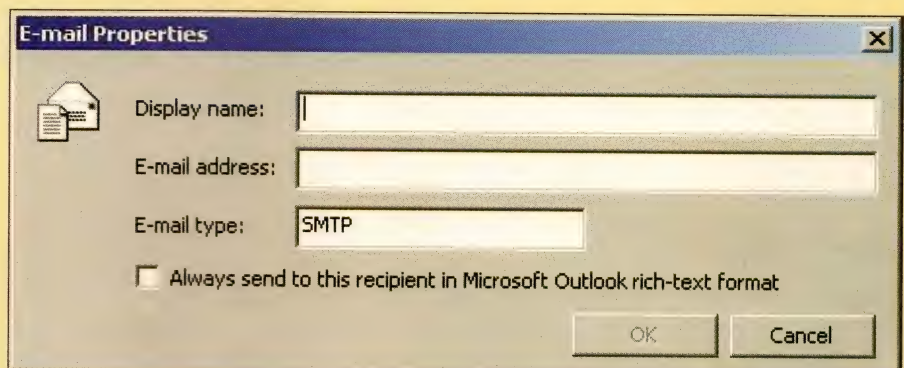
Sweet tweakall

Q In PC Authority issue 26, you gave a method of deleting the Favorites menu item from the Start button menu. Windows 98 Second Edition Update doesn't appear to have a PowerToys folder on the CD, and no tweakui.inf file can be found. Can you kindly advise on how to remove this folder?

D Williams

A I hadn't realised that Microsoft had withdrawn PowerToys from that version of Windows 98. Sorry about that. But all is not darkness, as thanks to Andy (ahumphreys), Jason (jason_o), and Philip (p_elphick) from the windows_98 conference on the Cix conferencing system, I can tell you of two ways to solve the problem.

The first is to go to www.abtons-shed.com/ and download TweakAll, a freeware utility that provides you with the ability to get rid of that menu item. I found the Web site extremely slow to load when I visited it, so be patient, or see what you can find on Tucows or Winfiles (although they might not have the latest versions there).



A One way to ensure that a message will be sent in Plain Text format.

Foré Product List

SINCE 1987 Buy DIRECT from an established supplier.

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Intel Celeron 466A (370)	\$172
Intel Celeron 500A (370)	\$182
Intel Celeron 533A (370)	\$234
Intel Celeron 566A (370)	\$259
Intel Celeron 600A (370)	\$280
Intel Celeron 633A (370)	\$344
Intel Celeron 667A (370)	\$472
Intel Pentium III 550E (370)	\$460
Intel Pentium III 600EB (370) 133	\$550
Intel Pentium III 650 (370)	\$600
Intel Pentium III 667 (370) 133	\$625
Intel Pentium III 700 (370)	\$780
Intel Pentium III 733 (370) 133	\$835
Intel Pentium III 750 (370)	\$1,120
Intel Pentium III 800EB (370) 133	\$1,370
Intel Pentium III 850 (370)	\$1,790
Intel Pentium III 866 (370) 133	\$1,820
AMD K6-2 450 3D (oem) (s-7)	\$123
AMD K6-2 500 3D (oem) (s-7)	\$136
AMD K6-3 400 3D (oem) (s-7)	\$174
AMD Athlon K7- 600 3D (oem) (Slot A)	\$450
AMD Athlon K7- 650 3D (oem) (Slot A)	\$510
AMD Athlon K7- 700 3D (oem) (Slot A)	\$595
AMD Athlon K7- 750 3D (oem) (Slot A)	\$835
AMD Athlon K7- 800 3D (oem) (Slot A)	\$1,225
AMD Athlon K7- 850 3D (oem) (Slot A)	\$1,712
AMD Athlon K7- 900 3D (oem) (Slot A)	\$1,876

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Abit BE6 (V2), BX, U/66	\$262
Abit BP6, BX, U/66 (370 dual)	\$262
Acen ASX9 PRO, 1M (s-7)	\$173
Acen AX63 PRO, VIA 133	\$180
ASUS P3VIA, U-66	\$178
ASUS P3C2000, 820, U-66 (VGA) 133	\$339
ASUS P3C-D, 820, U-66 (Dual) 133	\$825
ASUS P2BDS, BX, (Dual, U2W SCSI)	\$983
ASUS K7VIA, KX, U/66	\$338
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Gigabyte 6BX2000+, BX (Dual Bios)	\$239
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Gigabyte 68BX, BX (Dual)	\$290
Gigabyte GA-71X, U/66 (Slot A)	\$334
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Pochip M7461 (BMVGA, Audio, 56K, 10/100)	\$155
SuperMicro P11DM3, 840 (Dual, U3V, SCSI)	\$1,311

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lomega 250M Zip Ext. USB	\$343
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32M Asustek V3800 TNT2/TV I/O Ultra	\$386
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32M Asustek V6600 GeForce TV DLX	\$590
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32M Aopen PA3030G TNT2/TV Ultra	\$370
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32M Millennium G400 Dual Head (oem)	\$378
32M Millennium G400 Dual Head MAX	\$448
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Acer 77C 17", 27 1280x1024 60Hz	\$420
Acer 99C 19", 26 1600x1200 75Hz	\$1,120
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Hitachi CM643 17", 21 1600x1200 (Pro)	\$755
Hitachi CM715 19", 22 1600x1200	\$1,013
Hitachi CM769 19", 21 1800x1350	\$1,303
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Ricoh (8x4x30) 9060A IDE + Soft + Media	\$644
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9.1Gb Seagate Cheetah LVD68 5.2/6.0m	\$800
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- 32Mb Riva TNT2 Video Card
- 250W ATX Midi TowerCase
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- Logitech Wheel Mouse or MS Intellimouse
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- 56K V90 Internal Voice/Fax/Data Modem
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- 32Mb Matrox Millennium G400 Dual Head Video Card
- 250W ATX Midi TowerCase
- Logitech Internet or Honeywell Keyboard
- Logitech Wheel Mouse or MS Intellimouse
- Pioneer 16x DVD, 40x CD-ROM Drive
- Sound Blaster Live or Storm Platinum SoundCard
- Altec Lansing ACS22 Stereo Speakers
- 56K V90 Internal Voice/Fax/Data Modem
- Windows 98 on CD Installed & Configured

PRICE	PIII-550	\$2330
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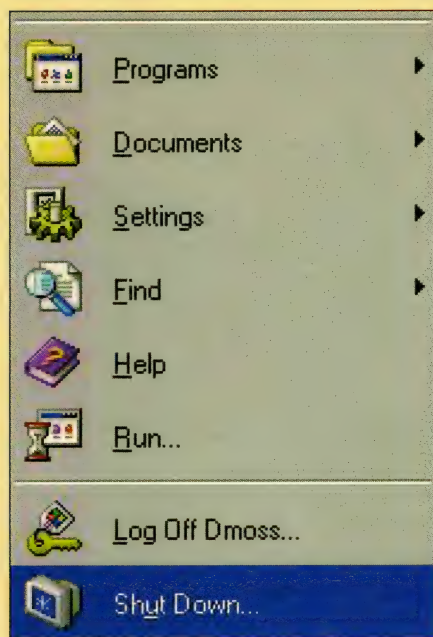
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A No more Favorites any more.

The second option involves assaulting the Windows Registry and creating a new value in an existing key. If you chose this route, follow the steps below, after having first backed up your system.dat and user.dat files:

- 1 Head for the Start button, click on it and select the Run... menu item.
- 2 Type 'regedit' (without the quotes) into the edit box and hit the Enter key.
- 3 Once the Registry Editor opens up, look for the following key:

HKEY_CURRENT_USER\Software\Microsoft\Windows\CurrentVersion\Policies\Explorer

- 4 When you arrive at the Explorer key, click on it. You may find an entry already in the right-hand pane, but regardless right-click in the right-hand pane and select the New menu item from the pop-up menu.
- 5 The menu will expand and you should now select the Binary Value menu item.
- 6 Replace the default text, 'New Value #1' with 'NoFavoritesMenu' (without the quotes).
- 7 Hit the Enter key when you've entered the new value.
- 8 Once you've done that, double-click on the new entry and the Edit Binary Value dialog box will appear.
- 9 The cursor will be flashing to the right of a group of four zeros <0>. Ignore them and type the following:

01,00,00,00

You won't see the commas appear in the dialog, but the numbers will, with a space automatically inserted between them.

- 10 Click OK when you have done that.
- 11 You should now see the value name

'NoFavoritesMenu' and it should now have a Data value of 01 00 00 00

12 You can now close the Registry Editor and restart your system. When it comes back up, you'll find that the Favorites menu item will have vanished from the Start menu.

I should point out that, as far as I know, you can use the PowerToys that came with Windows 98 Second Edition. If you can get hold of a copy, make sure you have the right PowerToys version.

02K password

Q How can I set Outlook 2000 up so that it prompts for a password when it's run? I've looked everywhere, but can't see how to do it. The only entry that might have been useful in the Help file referred to Exchange Server, which we don't have, and nor do we have an NT network, so we don't get our login confirmed by an NT domain controller. Any ideas?

J Ursul

A Right-click on the Outlook Today icon in the Outlook Shortcuts bar on the left-hand side, select the Properties menu item and then select Advanced. You should find that you can now set up a password. Make sure you leave the 'Save this password in your password list' box unchecked.

02K TaskPad

Q Every time I switch to Month view in Outlook 2000, I lose the TaskPad. Is there an easy way to restore it?

G Barnes

A It vanishes because the viewer decides what's the most appropriate size for the dates you're looking at, and when you get to Month view it hides the TaskPad to make

more room. It can, however, be unhidden - assuming you know where it is.

My opinion on this differs from that of Microsoft, so I'll give you both. According to Microsoft, when the calendar gets sized automatically so that the TaskPad is no longer visible, to get it back place your mouse pointer over the bottom of the area until it changes into a sizing pointer: hold down the left mouse button and then drag the pointer upwards to enlarge the TaskPad area.

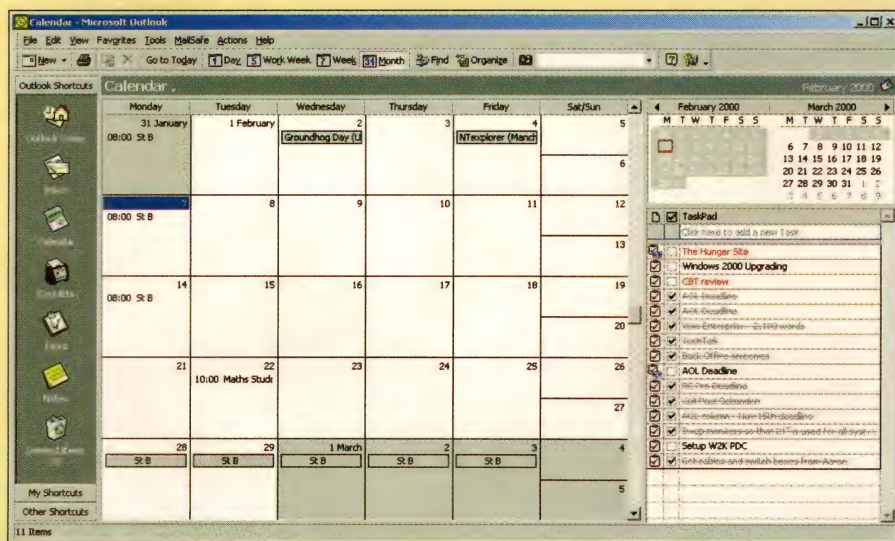
The only problem I have with that advice is that it doesn't work on my copy of Outlook 2000, so I assume I've set it up differently. With mine, which is set up to display the Shortcuts bar, Folder List and email messages with the preview pane switched on, I found that I need to move my mouse pointer to the right side of the Calendar when in monthly viewing mode. I discovered that the pointer changed to a sizing pointer just where the far side of the vertical scroll bar of the Calendar window met the inner right-edge of the main Outlook window. If I then dragged to the left the TaskPad sprang into view. Please do drop me a line if you find another way of exposing the TaskPad.

Kernel crash

Q I have a Sony Vaio 505 with 64Mb of RAM, a 4.3Gb hard disk (2Gb free) running Windows 98, and recently Control Panel gives me this message:

'EXPLORER caused an invalid page fault in module KERNEL32.DLL at 015f:bff9dba7'

This happens every time I try to load it. Sometimes, when I click Close, Control Panel continues to open as normal, but often it



A You can view TaskPad at the same time as Calendar with Outlook 2000, but it's a bit of a drag to do so.

Reader's tip

Access all areas

In issue 29 I gave a detailed answer to the question posed by C Daly about disk defragmentation. His question was: 'I run Windows 95, and every time I try to run Disk Defragmenter I get a message that part of the disk couldn't be accessed, and the ID No: DEFRAG006. It tells me to run ScanDisk, using the Thorough option. When I do this, everything is reported to be okay. Can you help me?'

John Wollaston was kind enough to email me with a simpler solution:

'Having experienced similar difficulties myself, you might be interested in my simpler remedy. The problem appears to be that the data isn't written to disk to the satisfaction of Windows 95/98 Defrag, but ScanDisk doesn't find it hard to read. This seems to be a particular problem on machines using DriveSpace 3 disk compression.

'Create a temporary directory on the same drive or another drive (or use a backup device). Drag-and-drop copy each root file and root directory to the newly-created temporary directory. When the drive becomes full, delete the original directory and continue to copy the remaining directories. When all directories have been copied, which writes them to new areas of the disk, the copied root files and all directories can be copied back to their original locations, thus overwriting any remaining files and reinvigorating any weak magnetic data.

'If any file/sector is faulty, it will be clearly shown at the original copy stage (though I've yet to find a faulty file/sector) and corrective measures can be taken using ScanDisk in Thorough mode.'

Many thanks, John.

crashes the whole system, forcing a restart. I've used the 'Ask Maxell' at the Microsoft Support Web site, and it indicates to increase the swapfile. I have, from 25Mb to 125Mb, but I still have the same problem. What can I do?

WW Cheung

A This happens when a Control Panel file (CPL) is damaged. These steps will find out if this is the case, and fix it.

- 1 Click on the Start button, select the Find menu item and then the Find Files or Folders option.
- 2 Type '*.cpl' in the Named box (without the quotes).
- 3 Use the Browse button and locate the c:\windows\system folder so that it appears in the Look In box (substitute the name of your own Windows folder if you didn't use the default).
- 4 Click on the Find Now button.
- 5 When the search is completed, double-click

on the CPL files one at a time. If one of them is damaged you'll get an invalid page fault in kernel32.dll. Close the Find window once you're finished.

6 Delete or rename the damaged file in the System folder, and then open Control Panel just to make sure it now works.

Then replace the damaged file by extracting a replacement from your Windows installation media. Knowledge Base article Q129605 shows you methods for doing that, and you'll find it at <http://support.microsoft.com/support/kb/articles/Q129/6/05.asp?LNG=ENG&SA=ALLKB>

Another possible cause for the error message only really applies if you have IBM's ViaVoice 98 installed. If this is the case, you may find a look through Knowledge Base article Q237826 useful. This can be found at: <http://support.microsoft.com/support/kb/articles/Q237/8/26.ASP?LNG=ENG&SA=ALLKB>

98 and 2K dual boot

Q You have, in the past, covered dual-booting Windows 98 and NT 4. Now would be a useful time to cover the issues involved in dual-booting Windows 98 and Windows 2000 Professional. Can Windows 2000 Professional be installed straight onto a Windows 98 FAT32 partition, with the boot manager taking care of everything?

M Sargent

A You can, in fact, set up your system to multiple boot MS-DOS, Windows 95 or 98, NT, and Windows 2000 all at the same time, so dual-booting between Windows 98 and Windows 2000 presents no difficulties. Just make sure that Windows 98 is installed first and don't worry about FAT32, as Windows 2000 understands it perfectly well. You will, of course, need a separate logical drive for Windows 2000, or do as I've done and use a different physical hard drive for each OS.

Linux and NT dual boot

Q Can anybody inform me of the best way of making Linux 6.5 run reliably with Windows 98 and NT 4 on the same hard disk? I've heard many contradicting theories about it being impossible to multipartition the hard drive and use Linux's Boot Druid.

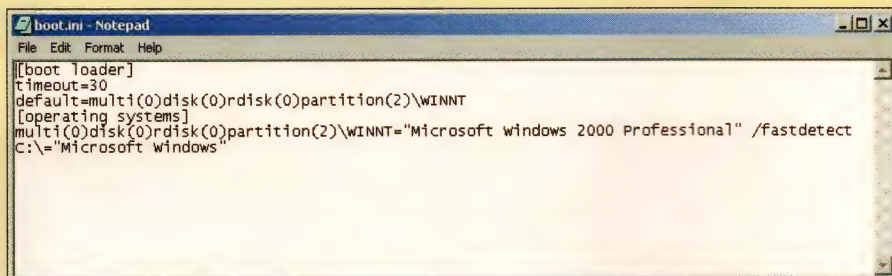
All I want is a multibootable system that enables me to play with all three (or maybe more) OSes, and form an unbiased well-informed opinion on each. My system incorporates a Tyan Super Socket 7 motherboard (with VIA Apollo chipset), 64Mb of RAM, an AMD K6-2 450MHz processor, SIS 4Mb AGP Card, 3Com EtherLink III ISA network card, Multitech 56K V.90 external modem, and a 17.2Gb Maxtor hard disk.

Can you foresee any problems with this setup, and would it be necessary to run Linux on a separate removable hard disk?

N Bull

A No, it's possible to run all three OSes on the same system. I haven't done this myself, but here's what Julie Dawson and Adam Langley have to say on the subject. I have a cautionary note too with regard to the Linux Boot Manager, and also a pointer on how to get rid of it should you so desire. Here's what Julie has to say:

'Option one: NTFS, FAT32 and Linux on one hard disk' Unfortunately, you have to create a tiny FAT16 partition, a couple of megabytes will do, because NTFS must write to hd0 Sector0. From there you can create a second FAT32 partition and install Windows 95, then set up NT creating an NTFS partition during the install. NT may add Windows 95 to its boot options, but if you intend to use Linux I suggest you edit the boot.ini and delete the Windows 95 entry to avoid booting to multiple menus. Finally, install Linux on the third partition and use LILO boot to



A The boot.ini file clearly shows Windows 98 and 2000 Professional dual-booting, but note that Windows 2000 is on a separate partition.

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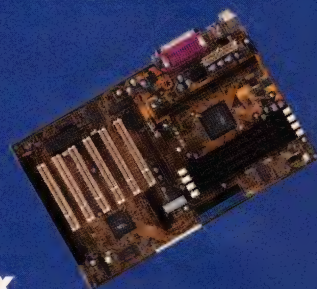
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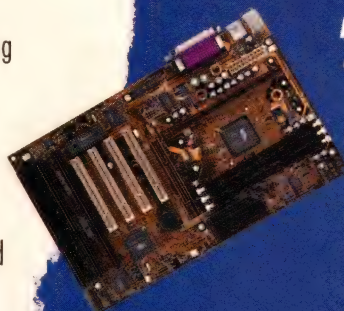
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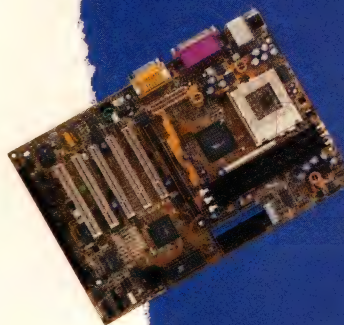
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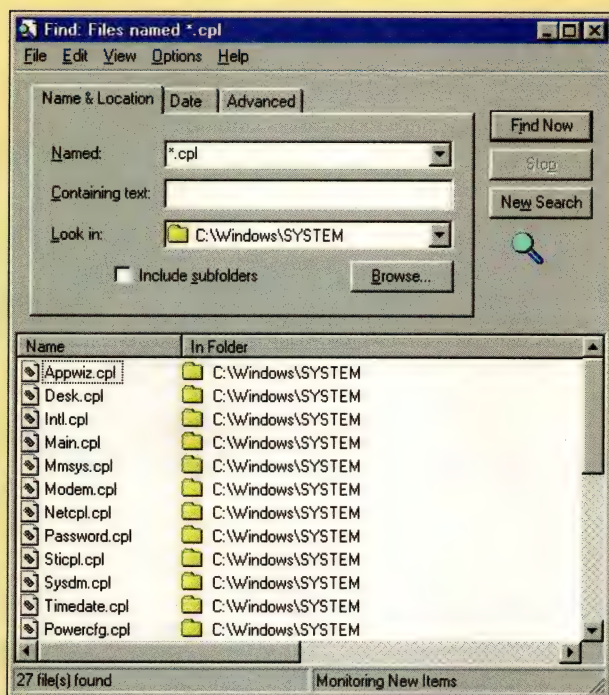
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A broken Control Panel CPL file can crash Windows 98.

jump between NT, Windows 95 and Linux.

Option two: If you have two or more hard disks and hate FAT16 This way is a botch job, but it's how I managed to eliminate FAT16. It involves pulling your PC to bits. It doesn't matter whether you install Windows 95 or NT, because one will not see the other initially, but make sure that one of your disks has an unformatted partition for Linux. Install NT onto your first hard disk, obviously formatting that partition as NTFS. Pull out your hard disk, set your second drive as the master and install Windows 95 on that (unless you're lucky enough to have a BIOS that will set your boot options to HD1, in which case you needn't lift the lid on your PC). Put the NTFS drive back in, setting it as master and your FAT32 drive as the slave. Finally, install Linux into the other partition and use LILO to jump between HD0 NTFS and HD1 FAT32.

Option three: OS2 Boot Manager If you're going to mess around with partitions, you should invest in Partition Magic. This software comes with a boot manager similar to OS2's Boot Manager, which works by sitting in your boot sector and setting a partition active: for example, you have Windows 95, NT and Linux, and you choose Windows 95 from the menu so the boot manager sets the Windows 95 partition active and boots you into that OS. Due to the way this works, you can't access any other OSes on the disk from the running one, as the other partitions are set to hidden. The only way to share information is via a second hard disk formatted FAT16, where all shared stuff can be housed. The good news is that it's simple, effective and supported by NT, Windows 95 and Linux.

If you wish to share info between a NTFS and FAT32 partition, drivers can be found at www.sysinternals.com. Beware! These drivers allow you to only read the partitions, and if you load DOSNTFS in your Windows 95 partition, Windows 95 will attempt to scan your NTFS partition every time you boot. Even editing the msdos.sys to 'set autoscans=1' doesn't solve the problem. Ideally, you'll need at least one FAT16 partition if you wish to share data between multiple OSes, so leaving your first partition at FAT16 and installing Windows 95 on that remains the best option. Furthermore, for the best performance everyone I've spoken to suggests you use a different hard disk for each OS, rather than trying to house them all on one.

NB: I've discovered that if you have an extended NTFS partition on the drive you wish to install Windows 98 on, you have a problem. You have to run the FDISK utility and delete the extended partition, then reinstall NT after Windows 98. Probing around, I found that Windows 98 seems to believe there's some form of disk compression on the drive, even if you're just installing into a standard primary FAT16 partition. This makes it imperative that to run multiple OSes you keep each one on a separate hard disk. It's much easier to format your primary hard disk, install Windows 98 and then replace the boot files for NT and Linux than to have to delete all your data and start again. Another point, Windows 98 is really picky: it wouldn't install on my PC even after I'd repartitioned and formatted my primary disk. Finally, I unplugged my second hard disk, which contained a Linux partition, and Windows 98 installed with no problem.

Adam then stepped in to offer this advice:

'After reading your Technical Support pages in *PC Authority* issue 12, I saw a suggestion for triple-booting NTFS, FAT32 and Linux. Well, here's a quick tip: Linux can be put in the NT boot menu. To do so, run LILO to create a boot sector on your Linux partition, then run:

```
dd if=/dev/hdc1 of=/hda/
bootsect.lnx bs=512 count=1
```

Replace /dev/hdc1 with your Linux partition and /hda/ with the mountpoint of your C drive under NT. This copies your Linux bootsector to

a file that NT reads as c:\bootsect.lnx. Then append c:\boot.ini with:

```
C:\BOOTSECT.LNX="Linux"
```

Reboot, and Linux should work off the NT boot menu.'

Example of C:\BOOT.INI

[Boot Loader]

```
timeout=05
```

```
Default=multi(0)disk(0)rdisk(0)partition(1)\
WINNT
```

[Operating Systems]

```
multi(0)disk(0)rdisk(0)partition(1)\WINNT=
"Windows NT Server Version 4.00"
```

```
multi(0)disk(0)rdisk(0)partition(1)\WINNT=
"Windows NT Server Version 4.00 [VGA mode]"
/basevideo /sos
```

```
C:\="Microsoft Windows 98"
```

```
C:\BOOTSECT.LNX="Linux"
```

I've a few more points to make in regard to LILO (Linux Loader). This is aimed at people who already have Linux on their systems and are wondering about adding Windows 9x to the melting pot. If you install Windows onto a system that already has Linux installed, Windows will either overwrite or deactivate the Linux Boot Manager. Which it will do depends on where LILO was installed initially. If it was installed to the Master Boot Record (MBR) of the hard disk, Windows will overwrite it when you run setup. If it was installed to the root directory of the Linux partition, that partition will have been made the active partition. When Windows is installed, the setup program makes the primary MS-DOS partition on which it is installed the active partition, effectively sidelining the Linux installation.

The method you choose to recover from this depends on how Linux was installed. If it was installed to the MBR, then restart your system using a bootable Linux floppy disk and run LILOCONFIG from the floppy. If Linux was installed to the root partition, you can use FDISK to reactivate the Linux partition.

If you're a NT user and want to get rid of the Linux Boot Manager entirely, you might find the Knowledge Base article Q171611 useful. Check out <http://support.microsoft.com/support/kb/articles/Q171/6/11.ASP?LNG=ENG&SA=ALLKB>



David Moss

Software developer, consultant, Web designer and freelance computer journalist specialising in Visual Basic and Windows.



Speed machine

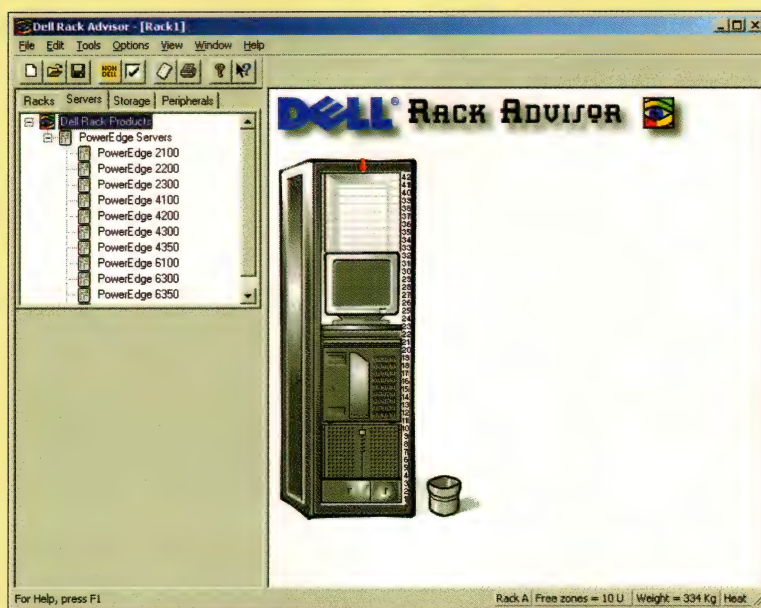
Jon Honeyball slips on his running shoes and explains how you can work out the speed of your machine.

Trying to work out just how fast a computer is going is a very important fact of IT life. When a user comes to you and complains that their computer just isn't fast enough, you need to have the tools to provide evidence that either agrees or disagrees with them. As a master system administrator you'll disagree with them as a matter of principle; after all, if it looks like they've managed to acquire a very fast computer by mistake and all it needs is a little software tweaking, this machine needs to be on your desk rather than theirs. Nevertheless, trying to work out what load you can apply to a Terminal Server box, or how to benchmark some new computers that have been

delivered, is a real-world issue in corporate network land, but the staggering thing is that sysadmins seem to fall for the same old marketing hype every time.

There are basically four ways of 'sizing' a server, and thus deciding on what load it can take. The first is the Brochure Method, which involves getting a glossy catalogue from a vendor, looking for the largest device it makes and then deciding that this is what's required. The wired version of this technique involves going to the manufacturer's Web site and choosing the biggest box, and then clicking on all of those combo boxes to get all the additional features added in. Don't look too closely at the cost calculator, which proudly displays the final price of your wicked excess - that's just a problem for the financial director, isn't it?

I must say, Dell's Web site is excellent for this game - though, regrettably, the site



The Dell Rack Advisor - drag and drop and watch your wallet disappear.

doesn't allow for external storage racks, which could have added lots more to the price. In fact, Dell has the nicest piece of Brochureware in the business - the Dell Rack Advisor is a piece of Windows software that allows you to design your own rack layouts. Just drag and drop the eight-way Xeon servers into the rack space and it will calculate the power consumption, size of UPS required, heat output and so forth. It's most useful when you play with the Brochure Method, because it ensures you don't forget those extra flange kits or cooling fan options. You might laugh at the Brochure Method of server sizing, but I've seen exactly this approach taken for real in a financial institution in London. Of course, this company has (our) money to burn, but it did come as a shock to discover that the server it had ordered was chosen simply because it was the biggest one on the vendor's Web site.

The second method of machine sizing is

known as the Skip Method, and is much loved by the Linux brigade, which proudly proclaims that its latest build will run quite happily on that delicious 386/33 processor armed with 16Mb of RAM - such hardware is often to be found in skips, hence the name. These people usually get angry at the suggestion that such devices are well beyond their useful lifespan, their Gap overalls trembling with indignation. However, the reality is that it isn't possible to get meaningful technical support and backup on such old devices, and this is far more important to many companies than the cost of the hardware itself. Obsolete

hardware might well be perfectly functional at performing the task, but unless it can be covered by an umbrella, on-site support contract, it has to go.

The third method is the scariest of all and I call it the Laying On Of Hands method. A sharp-suited consultant is asked to evaluate the likely capacity of an existing server, even though at this point the actual real-world load is usually undefined, so any figure he comes up with will be a matter of pure fiction. He looks carefully at the badge, opens up the casework using his new Victorinox Swiss Army CyberTool (see www.victorinox.ch/home_en/best_en/news10_en/index.htm) and counts the processors and RAM chips. Then he performs 'the ritual of the laying on of the hands', which requires him to place both hands, palm downwards, on the top of the casework and deeply furrow his brow. He feels the inner vibrations of the hard disk stack and his



A The Cyber Tool - an essential item for every budding UberGeek.

fingertips tingle to the resonance of the processor fans. A light sheen of sweat erupts on his forehead and, after about ten seconds or so, he steps back and proclaims that this server is suitable for 73 concurrent users 'but only on Service Pack 6A with the new WhoFlungWot AGP/PCI bus relocation drivers'. The latter point is important, because the client won't actually be able to get those drivers and hence any liability for accuracy is automatically negated.

Again, you might laugh at the suggestion that this happens, but believe me it does. With my consultant hat on, I sat in on one corporate IT meeting where a sharp-suit proudly proclaimed that the servers they were buying were suitable for 58 concurrent users. When pressed he had to admit that this number was a work of pure fiction, and that he had proffered it solely because he couldn't bear the embarrassment of having to admit that he had no idea what the load or capability would actually be in real use.

The fourth method is the proper method of machine sizing. The question that always has to be asked is 'What is the load that will actually be encountered?' And strange thing to say, but there are some excellent tools out there that allow you to practically and reliably work out just how quick your computers and servers are. However, some of these tools can be amazingly expensive, especially if you want to do multiclient load simulations on a Terminal Server computer.

Since we're all grown-up boys and girls, we know that we should keep a close eye on our performance monitor counters. A quick glance at my Terminal Server computer shows that the System Idle Process has been running for 1,245 hours, 56 minutes, 40 seconds. The next

most time-consuming task is one of the system core modules, which has taken 14 minutes, 58 seconds of processor time over the same time period. This should give you a clear indication that an idling NT server is doing exactly that - idling - and the same is true of a desktop machine.

When you actually run a desktop machine flat out, it can be startling to see just how quickly it can run. A good way of doing this is to run some automated test scripts against known applications, and best of all is to use a proper benchmarking suite. I know that *PC Authority* would love you to run its test suite, but I'm sure that negotiating the distribution rights to all those applications is a headache they don't want to take on. No matter because the new SysMark 2000 release from BAPCo allows you to run application tests in Photoshop, Premiere, Elastic Reality, Bryce, Paradox, CorelDraw, Excel, Netscape, PowerPoint and Word. All the results can be stored away and evaluated to your heart's content. Just running its Excel test on a standard desktop can seriously upset that user who was whining about needing a faster computer. Just ask them to work at the same speed that the test manages, and you'll find their upgrade itch will disappear like the morning mist.

BAPCo is excellent for benchmarking and load stressing using standard line of business applications, but when it comes to working out what makes a great games machine, you need a different set of tools.

Game speed

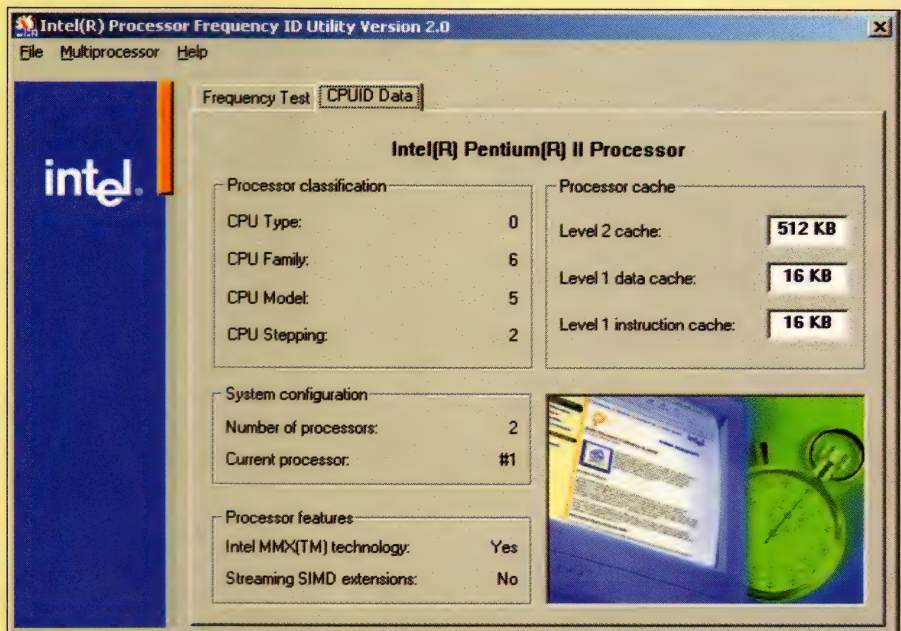
At this point, I should probably confess that my interest in games like Quake is almost zero, as

I find something rather distasteful about running around a castle gratuitously shooting people with rocket launchers and machine guns - I'm not sure what it is, I can't quite put my finger on it. Nevertheless, the technology of Quake II was always fascinating to see in action. The arrival of Quake III has put a completely different spin on the matter, as this is a simulation whose graphical quality can only be described as 'cinematographic', and the rate at which it can throw the images on screen is pretty dramatic too.

I decided to see what the current state-of-the-art was for a Windows 98 graphics platform speed, and so I built up a computer based around the new AMD Athlon 800MHz processor and the Intel 733MHz Pentium III. Naturally, I intended to stick to fairly standard peripherals, but had difficulty turning down the 9Gb IBM hard disk and the new SoundBlaster Live! Platinum card. For graphics, I went with the scorchingly quick GeForce 256-based graphics card from Asus.

One of the big advantages of systems like Windows CE is their 'instant on' facility, where you just press the power button and your desktop is there waiting for you. Well, the fact is that I now seem to have a Windows 98 system that has 'instant on', as boot times are measured in a few seconds only, such is the rate at which this hardware can haul in the operating system from disk. Then I loaded up the latest drivers for the GeForce 256 card (I find www.betanews.com to be invaluable for locating the latest drivers) and installed the monster that's Quake III Arena.

I was expecting high performance, but I was totally unprepared for the speed and quality that this system gave me: achieving 90fps (frames per second) at 640 x 480 is the



A Intel's processor identification utility tells you about the chip inside.

sort of performance that a dedicated Quake II player would have died for. This was with all the Quake III quality settings set to maximum - 32-bit textures, trilinear filtering and so forth. I did my best to make the system go slower and it still churned out 90fps, although raising the resolution to 1,024 x 768 dropped the frame rate down to about 62fps, which is still staggering: that's high-definition TV resolution at twice the current TV frame rate. The only conclusion I can draw from this is that 3D modelling of spaces and environments can now run at any reasonable speed you want on the latest hardware. Remembering that Quake III is a highly-tuned environment - with limited support for very complex items such as curved surfaces and so forth - you still wonder just what might be achieved by using the core Quake engine for other more photorealistic jobs: the performance definitely seems to be there.

To get a really objective view of the graphics card, processor and video card performance, I used the newly-released 3DMark2000 test suite. In the past, I've mentioned the 3DMark99 MAX suite, but the 3DMark2000 suite moves the whole system forward and utilises the latest capabilities of processors and graphics cards. It can systematically test your setup and show you precisely what's working well and what's going slow. The tests are all oriented towards games and 3D visualisation speed, so there's little point using this if you spend your life in Excel and Word. However, if you want to get a grip on what effect a graphics card driver change is having on your gameplay, 3DMark2000 gives you an independent and repeatable benchmark.

Obtaining 3DMark2000 is easy: go to www.madonion.com and download the trial version. The full version doesn't cost much and is just a key licence upgrade to your trialware download. To get BAPCo SysMark2000, you have to purchase it online and it will then be sent to you on CD. All those installation images for the test programs take up a lot of space, resulting in a size that most users wouldn't sensibly be able to download via a modem. I regard both products to be essential for evaluating machine performance, as it's very easy to delude yourself into thinking that something is going quicker after you've made a change to a system. Having the hard numbers is always invaluable.

Projected speed

As an example of high-speed rendered graphics using the OpenGL language, Quake III sets new standards for performance and quality - if you have a big enough computer. However, OpenGL is used for photorealistic work too, and it's the backbone of the graphics generated at Pixar,



A Quake III in full high-speed glory - astonishing power on modern machines.

home of the RenderMan software and movies such as *A Bug's Life* and *Toy Story*. I see from the Pixar Web site that RenderMan is soon coming to Windows NT, and it will be interesting to see how this hardware platform compares in price/performance terms to the extreme machines from companies such as Silicon Graphics.

Actually, it's worth digressing for a moment to consider high-resolution image technology. I was fortunate enough to see *Toy Story 2*, recently, and the projection system used was the new DLP (Digital Light Processing) system based on processors made by Texas Instruments. In case you haven't been following this technology, these are chip-sized devices that contain a grid of thousands of tiny individually-hinged mirrors, each mirror acting as one pixel in the final image by reflecting light to the observer's eye or not.

The chip is called a Digital Micromirror Device, because there are more than 500,000 mirrors crammed onto it, which can be swivelled on and off at more than 5,000 times per second. That speed allows the chip to be pulsed, creating the impression of levels other than 'full on' and 'full off', and thus a range of intermediate intensities: Texas Instruments claims between 12- and 14-bits of shading. By using large coloured lamps and coloured filters, you can set up three of these chips to act as red, green and blue channels, and by driving the mirrors directly from a computer you can project an image onto a screen.

The current resolution of these devices, according to the Texas Instruments Web site at www.ti.com/dlp/products, is 1,280 x 1,024 pixels, and there's a range of product types in which they're used. Large cinema screens are

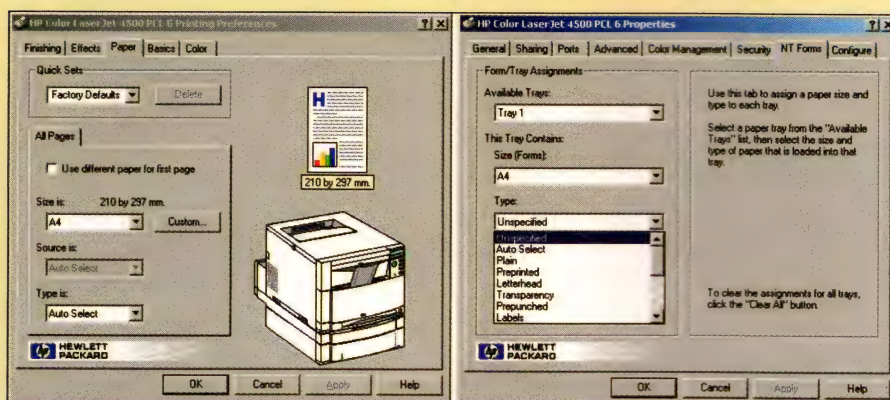
one obvious use, as is a more portable projection system, aimed at the marketplace traditionally covered by BAPCo projectors. Ultimately, it would be great to have these chips in a domestic product, but I expect this is a long way off.

This resolution issue is fascinating. According to the Pixar Web site, the resolution of *A Bug's Life* was 2,048 x 872 pixels, which is obviously a widescreen format at 2.34:1 aspect ratio. I expected that pixellation would be a problem when viewing *Toy Story 2* projected on the DLP system to a full-sized cinema screen; after all, when you project 2,048 pixels onto a 30m-wide screen each pixel must be 1.5 cm across. Then I remembered that distance is vitally important in this equation, and when sitting some 20 to 30m away from the screen, it isn't possible to see the individual pixels.

When software like Quake III can generate high-quality scenes at 1,024 x 768 pixels and very high refresh rate, you can see that we're getting close to being able to generate film-quality 3D graphics on a PC in real-time, or at least that's the claim a friend made after seeing the film. However, a word of caution - the amount of detail shown in *Toy Story 2* is vastly greater than anything you see inside a Quake III scene. That's why it takes Pixar hours to render each frame, rather than generating 90fps. Unfortunately, if you want the real quality, you still have to pay the processing price.

Intel speed checker

The Intel Processor Frequency ID Utility (PFIDM) from Intel's Web site is a useful one you can download to tell you what speed your



A New Windows 2000 printer drivers from HP.

processor is running at. And even if it does only work on recent Intel processors, it might be useful if you think something is awry. Obviously, being able to measure what size of cache the processor has is useful if you fear you've been sold 512Kb Xeon processors rather than the full 2Mb versions. I've also found it useful because it does report the CPU stepping number, and this can be important in a symmetrical multiprocessor (SMP) computer. As the help file states: 'The "stepping" number indicates design or manufacturing revision data for production Intel microprocessors (for example, Stepping 4). Stepping is used to indicate a "revision". By using unique steppings, it facilitates change control and tracking. Stepping also allows an end user to identify more specifically which version of the processor their system contains. This classification data may be needed by Intel when trying to determine the microprocessor's internal design or manufacturing characteristics.'

Why does this matter? Well, a number of readers have told me that they've seen problems with SMP machines running NT 4 and Windows 2000 when the stepping revisions of the multiple processors aren't the same. To be honest, I haven't seen this myself, but a quick check with the PFIDU applet has shown that all the stepping versions of my SMP computers are self-consistent. If you're suffering from strange problems on an SMP computer running NT 4 or Windows 2000, it might well be worth checking the stepping level of both (or all, in a large server) processors. Obviously, I can't guarantee that this will solve your problems, but it might point to a problem area you'll want to take up with your hardware vendor. Having the information to hand is the key point, and this utility shows you the information.

PS: I've just had a thought - I just fired up the SysInfo utility in Windows 2000, and discovered that this tells me the stepping level of both processors too. Thought I'd better tell you before you bombard me with email

pointing me to the SysInfo tool. PFIDU is still of use on Windows 9x boxes though, so am I forgiven now?

HP drivers

I should give a quick plug to some new drivers that will be of interest to you. First, there's a revised version of the Microsoft Mouse drivers available at www.microsoft.com/products/hardware/mouse/driver/drivers_pc.htm, which includes the IntelliPoint 3.1 release of software which will be of interest to those who use the new optical mice from Microsoft. I bought both the grey Explorer version of the mouse and the standard white-soap version, both with the optical pickups. To be honest, I hate the grey Explorer version, as its base flares out towards the desktop and this makes it hard to pick up and hold. Other users I know have reported RSI problems with this mouse too, though in fairness even more people have said they love it to pieces. I found it awkward to use and I didn't like the surface texture either, because it felt cheap. So I swapped over to the white-soap version and my faith was restored. The 3.1 drivers include support for Windows 2000, so you can get your favourite accelerations set up on that platform too.

Writing this before the final release of Windows 2000, there are still a number of vendors that are being rather tardy at releasing their final Windows 2000 drivers. A few are claiming that they can't release the drivers until the shrinkwrap is released by Microsoft, but sources inside Microsoft tell me that this is just finger-pointing and wailing by the driver writers, because there's no embargo on them releasing drivers as soon as they're ready. One even suggested that this tactic was giving these writers a useful few weeks to do some beta testing.

However, HP has just released a pile of printer drivers for Windows 2000, which you can find at www.hp.com/pond/ljbeta/win2k_software.html. I downloaded the driver for the HP Color LaserJet 4500, my impressive and useful colour laser printer. You might

remember that I reported problems when printing shaded colour areas from Excel, and I was intrigued to learn whether the problems persisted. Well, I'm happy to say I think they've been fixed. There's some good new functionality in these drivers and I recommend that Windows 2000-wielding HP printer users take a look. I expect the final versions of the drivers will be out by the time you read this, so that URL might have changed slightly.

More SOAP

I'm told that the whole Windows Scripting Host (WSH) engine has been merged into Visual Basic 7; a sensible move because it brings the two primary scripting engines together. But this has led to a problem, as WSH allows you to host a number of different scripting languages within it, and making VB 7 a WSH host has led to some unfortunate naming like 'VB 7 Using Perl', 'VB 7 Using Java' and 'VB 7 Using Python'. However, I'm sure the marketing people can spin this clean before the product ships.

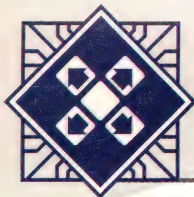
Last month, I detailed Microsoft's plans to bring SOAP to market this summer - SOAP being the Simple Object Access Protocol, which employs XML over HTTP instead of DCOM over RPC. This, too, will figure heavily in VB 7. Some deep sources inside Redmond tell me there's a convertor tool for existing COM objects written in VB 6, codenamed Exfoliator, which strips off the interfaces and wraps them in SOAP. Also, you'll be pleased to know that the debug and trace utility has been heavily revised and is now known as Deep Cleanser.

The acronym generator is working flat out in Redmond it seems, and it's hard to keep on top of them all. The big vision of SOAP has led to Single-Homed Object WAP-Enabled Response, for bringing in the needs of the WAP user to the IIS5 space, while getting connecting to CORBA objects is helped greatly, I'm told, by the use of Simple Protocol Over Non-Generic Elements, which leverages a Local Objects Over Fetched Application Hierarchy - is obviously vital for working in multiserver environments. SOAP will also be tightly coupled to its own object support infrastructure called Remote Object Protocol Extensions. Expect to see announcements from Microsoft on this as part of the initial public viewing of VB 7 any time now.



Jon Honeyball

Computer journalist and consultant specialising in both client/server and office automation applications.



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- 17" Sony CPD-E200 Monitor
- Creative Vibra 128 PCI Sound Card
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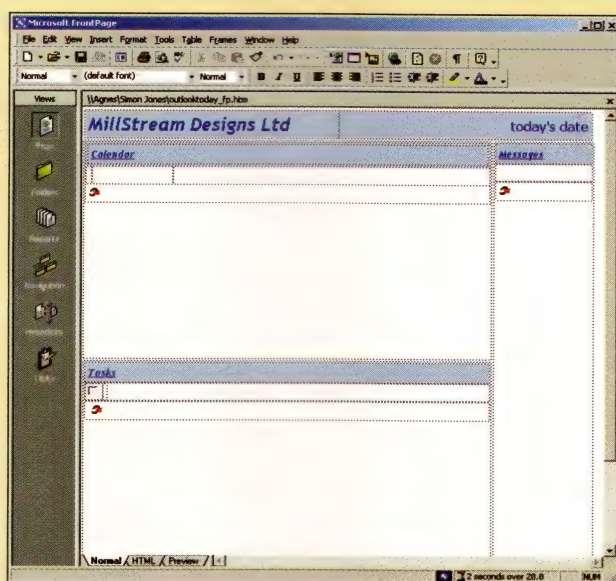
Companies often put out software without the potential user having any idea what it's for. **Simon Jones** clarifies one such program.

Microsoft has been trumpeting its Digital Dashboard technology for a few months now, but many people are still confused as to what it is and what you can do with it. Perhaps the best way to sum it up is that a simple Digital Dashboard is like Outlook Today with knobs on, while more complex Dashboards have big gold knobs encrusted with diamonds.

At the lower end of the spectrum, Dashboard technology can give you a custom-built Outlook Today that shows a summary of new messages, tasks, appointments and events for the next day or week, which can be formatted and arranged exactly how you want them: in your company's colour scheme with the company's logo.

The Digital Dashboard Starter Kit contains a sample called First Dashboard that you can customise as much as you want: it's just an HTML page containing some styles, a couple of small JavaScript functions and some ActiveX controls that provide the summary data. Go into Outlook and you'll see that the Digital Dashboard Starter Kit has added some folders, each of which shows an HTML page instead of a listing of its contents, and the First Dashboard folder shows the First Dashboard HTML page. There's a button on this page that will open the page for editing in FrontPage 2000, though you can do this manually (or start a completely new page). All the ActiveX controls of First Dashboard are available directly in FrontPage: an Add-In puts an Outlook Controls item on FrontPage's Insert menu giving access to the Calendar, My Tasks and New Messages summary controls, as well as the Outlook View control, which can show any view of any folder.

Customising the formatting of the summary controls is a little hit and miss. There are



A You can create new Digital Dashboards using FrontPage 2000.

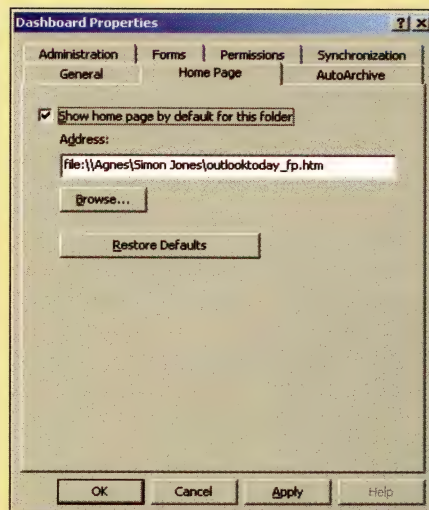
several styles defined at the top of the HTML page, but no documentation to say what styles the ActiveX controls will respond to - you'll have to rummage around in the examples and in the source code for Outlook Today to find out what's possible. Another problem is that the summary controls won't show any data until they're run from inside Outlook. Neither the preview mode in FrontPage nor Internet Explorer will show any data, and so you have to save the page and refresh the Dashboard view in Outlook to see your changes with live data.

What gets shown by the summary controls is decided by several Registry settings, and the Customize Outlook Today function - part of Outlook itself - writes to these Registry settings to say which folders are to show in the New Messages control, how many days to list in the Calendar control and in what order the Tasks should be sorted. You can copy and edit this page if you want to, but be careful if you do

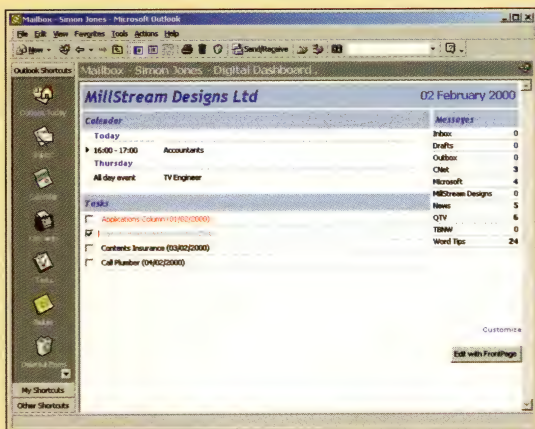
as there's a lot of code behind the scenes that's tied to the names of the checkboxes, radio buttons and so forth. If you copy a control and delete the original, the name of the new control will be different and the code will no longer work. You have to know quite a lot about HTML, VBScript and JavaScript to be able to edit this page without any problems.

First Dashboard is useful, but it only scratches the surface of what's possible. Your Dashboard page can have text or graphic links to other folders in Outlook/Exchange, and these folders may hold common corporate data such as a list of customers. These could be based upon customised Contact forms and shown through another HTML page that offered quick access to common processes for your line of business, or for individual users.

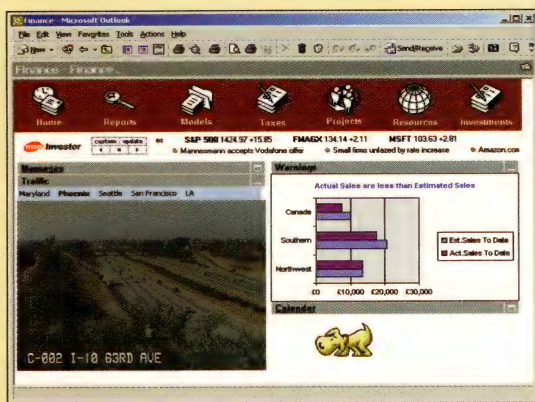
If the data is too complex to hold in Exchange, or already exists elsewhere,



A Setting Data properties for FlexGrid Pro 7.



A My new Digital Dashboard installed as Outlook Today.



A An example Dashboard for a financial controller.

you can use Office Web Components and other ActiveX controls to display data in SQL Server, Oracle or any other data store for which you have ODBC or OLE-DB drivers. There are ODBC drivers available for accounts packages such as Sage Line 50, which you can use to show graphs, lists or PivotTables of live accounts data from within Outlook. This means your financial controller can see the aged debtors list/chart at any time without having to start up the accounts package.

There are five more sophisticated example Dashboards included in the starter kit: three for specific lines of business (manufacturing, healthcare and insurance) and the other two for specific job roles, finance and sales. These examples consist of several folders, each with its own HTML front page. Big button icons switch between the folders, displaying the data using a common 'information nugget' format, where the user can show or hide each nugget as they wish.

Many of the examples include a 'ticker' control that shows stock prices, US weather maps or Webcam pictures of major roads in the US. These will be of little use to anyone in Australia, but they're provided to illustrate the possibilities and should not be taken too literally. You might

equally use a ticker control to show your own corporate news and events, while the Webcam pictures could come from a manufacturing production line. Or again, you could use graphics to show the number of support calls outstanding by type, severity and duration. The aim of a Dashboard is to make someone's job easier by bringing useful information together in one place, and providing links to the more detailed information and business processes.

Digging up nuggets

The 'nugget' format, used in the more complex examples, surrounds each ActiveX control or image with a little extra HTML and JavaScript code. It's relatively easy to copy this wrapper code and adapt it to your own purposes (although it does help to know HTML, as you often have to abandon the wysiwyg display of FrontPage and edit the HTML source directly). It would be very nice if FrontPage could exploit its IntelliSense ability to know the properties, methods and events of the objects on the page, and I'll be

much happier once HTML pages are as easy to lay out as VB or VBA forms are now. Is it better to

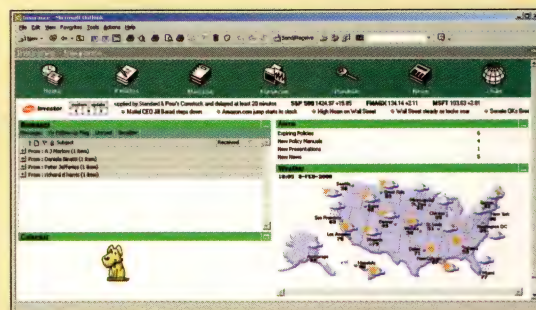
say `<Div align=center></Div>` or `<Div><Center></Center></Div>?` I don't know the answer and, so it seems, neither does FrontPage.

FrontPage generates great long lines of HTML with no breaks, indentation or other formatting that might aid its reading by humans. This isn't very friendly, and I sincerely hope the next version either makes reading and editing HTML redundant altogether, or makes a proper job of intelligently indenting the HTML to make it readable.

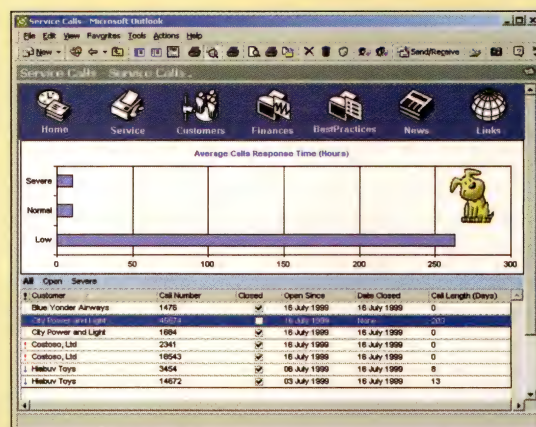
The Office Web Components provide neat ways to put live mini-spreadsheets, PivotTables and PivotGraphs into a Digital Dashboard - or indeed into any other Web page. One of the best ways to find out what they can do is to make a sheet, PivotTable or PivotGraph in Excel and then save it as a Web page. You'll find a checkbox on the Save As dialog labelled Add Interactivity and you should tick this

box and then press the Publish button. Check the next dialog to make sure the file is being saved as you want it. Excel will write an HTML page that you can then open in Internet Explorer, and you can play with the resulting page to find out what it can do and then view the source of the page to find out how it's constructed. You can then cut and paste the HTML code from this Web page into your own Digital Dashboard in FrontPage. Alternatively, you can insert the Office Web Components directly in FrontPage.

When you're building a Dashboard there are a couple of factors you ought to bear in mind; namely, how long it will take to build and test and how long it will take to load. The more complex the HTML is, the longer it will take to render. Complex PivotTables from remote data sources and pictures from dial-up links will take a long time to retrieve and paint, and if it takes much longer than 20 seconds to show the page your user might be discouraged from using it. Think carefully when you plan a Dashboard. Talk to your users to find out what they'd like and which elements they'd find most useful - don't just throw everything you can think of into the one page, as the nuggets could end up being too small to be useful. Remember that all the nuggets on a page will load, even if some of them aren't visible at first. Images and data might still be being retrieved and this may slow things down.



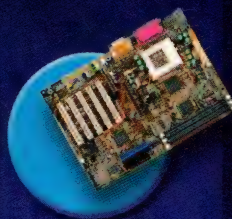
A An example Dashboard for the insurance industry.



A An example Dashboard showing service calls.

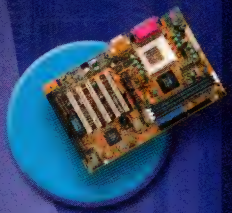
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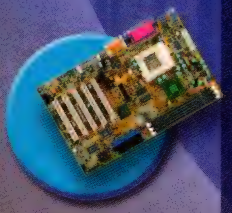
TS-ACD3

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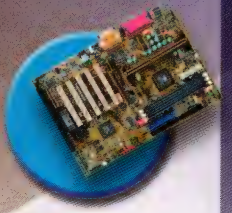
TS-AVE3

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- CPU: Socket 370 PPGA/FC-PGA 300-933+ MHz (Pentium III, Celeron, Cyrix)
- FSB: 66/100/133MHz (66-150MHz overclock range)
- Memory: 3 x DIMM up to 1.5GB (PC100/133/VCN)
- Expansion: 5 x PCI, 1 x ISA/AMR (shared), 1 x AGP4X
- Easy Setting (FSB, Multiplier and CPU voltage); H/W approach for BIOS protection



TS-AWE3

- Intel 810E Chipset; ATX form factor
- CPU: Socket 370 PPGA/FC-PGA 300-933+ MHz (Pentium III, Celeron, Cyrix)
- FSB: 66/100/133MHz (66-150MHz overclock range)
- Memory: 3 x DIMM up to 512MB (PC100)
- Expansion: 5 x PCI, 1 x AMR
- Onboard AGP2X VGA and AC97 Audio; Anti-virus BIOS



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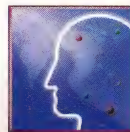
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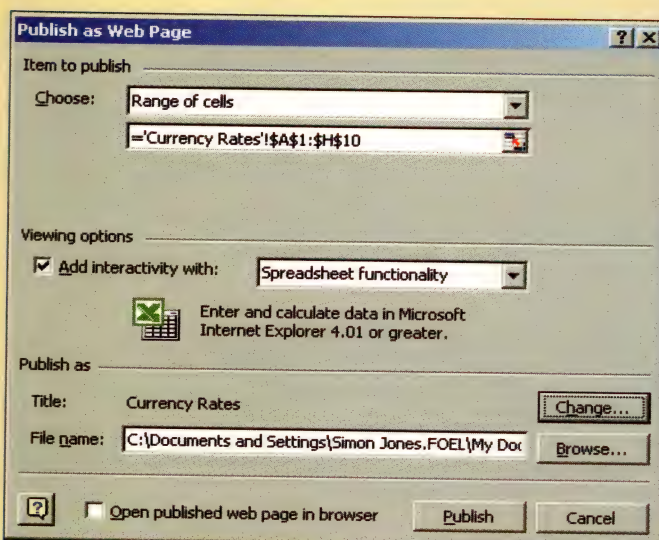
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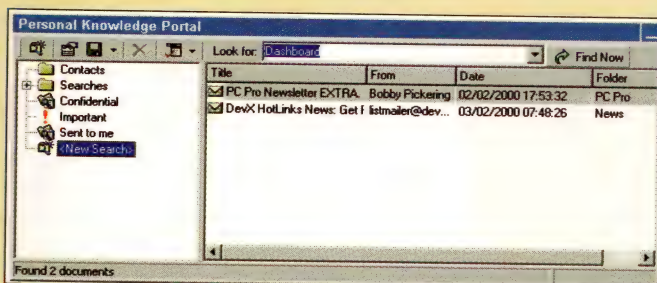
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A You can publish an Excel sheet using the Office Web Components.

If you want to know more about Digital Dashboard, you can see a demonstration, read some White Papers and get the Digital Dashboard Starter Kit from Microsoft's Web site: www.microsoft.com/DigitalNervousSystem/km/DigitalDashboard.htm



A 80-20's Personal Knowledge Portal indexes items for instant searchability.

Office Web Components are detailed in the MSDN Library, which you should have if you've installed Office 2000 Developer. Alternatively see these links: www.microsoft.com/office/enterprise/prodinfo/webcmpnt.htm, www.microsoft.com/office/enterprise/prodinfo/OSEFnSce.htm or <http://msdn.microsoft.com/library/officedev/odeopg/deovrworkingwithofficewebcomponents.htm>

You can also get information from Programming Microsoft Office 2000 Web Components by Dave Stearns, published by Microsoft Press, ISBN: 073560794X. Excerpts are available in the MSDN Library at: <http://msdn.microsoft.com/library/techart/ofintrowbcom.htm>

A company called 80-20 Software makes a nugget called Personal Knowledge Portal, which indexes all your Outlook items (including attachments) and allows you to find items instantly without waiting for Outlook to search through all the items. Details of the control, how to incorporate it into a Digital Dashboard and a 14-day trial version can be found at: www.80-20.com



Simon Jones

IT consultant specialising in Visual Basic, SQL Server and MS Office integration. Lives with a Gordon Setter and a large motorbike.



Keeping tabs

Paul Ockenden continues to DOS around, while **Mark Newton** visits a bridge in Bermuda.

Oh, the irony! We write about a really nasty task - something that, frankly, we'd like to forget about - and it generates a record volume of email. The nasty task referred to, of course, was that site monitoring system that ran on an NT box using the standard AT scheduler and lots of horrible DOS commands. Why this should fascinate so many of you, we have no idea. Anyway, in your emails many of you wanted to take up Paul on his glib offer to show how to extend this monitoring system to check the free disk space on the server as well as Web server failures.

In that article we used a batch file running every five minutes that checks for Web server problems, and we were using a freeware utility called `wwwget` to grab the pages, followed by the DOS `'find'` command to check for errors. If we spotted a problem we used `Blat!` to send an email, which, by employing something like Cellnet's Genie service, we could route as an SMS message through to a mobile phone.

Why would we want to extend this system to check for free disk space? The answer is log files. Web server log files are like weeds in a garden pond: they start off fairly innocuously taking up very little space, then you turn your back and

they've taken over. This is especially true for high-volume Web servers, which tend to be tucked away in the corner of a machine room just humming away, efficiently serving pages. There will be regular backups, but beyond that the machines will be left alone.

The problem is that every time a page or graphic gets served, it will add an entry to the end of the log file. Even a medium-load server will probably be generating log files of around 100Mb per day, and higher-volume servers might be generating a gigabyte or more. It doesn't take a mathematical genius to work out that a typical 30 to 40Gb RAID array will fill up rapidly at this rate, and once the drive is full the server will either stop logging or else stop serving pages.

So how do you add disk-space checking to your monitoring system? Well, because of the way we constructed the previous content-checking system, the easiest way would be to get the Web server itself to report on the free space, and then extend your content-checking technique to find and report on any problems discovered. This is easy to do if your Web server supports a scripting language. We'll show you an example using ASP/IIS on NT Server (or PWS if you run a workstation flavour of Windows), because most readers will have

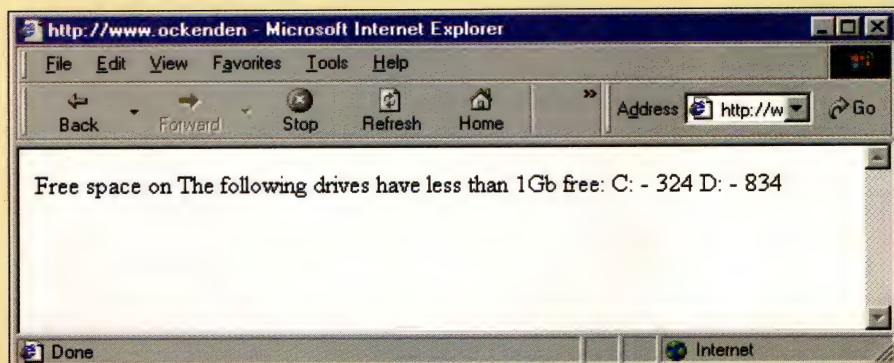
access to a Windows machine of some sort; those of you using different platforms should be able to adapt the code.

The first thing to do is dump the following ASP page onto the server somewhere. The more paranoid among you will probably give it an obscure name and password protect it - we tend to call it `freespace.asp` and dump it in the root directory.

```
<%
response.write "The following drives have less than
1Gb free:" & chr(13) & chr(10)
Set fs =
CreateObject("Scripting.FileSystemObject")
Set dc = fs.Drives
For Each d in dc
    cc = freespace(d.driveletter)
    if cc < 1024 then
        response.write d.driveletter & "- " & cc &
chr(13) & chr(10)
    end if
Next
function FreeSpace(drvPath)
Set d =
fs.GetDrive(fs.GetDriveName(drvPath&":"))
if d.isready and d.drivetype = 2 then
    freespace = int(d.FreeSpace/1024/1024)
else
    freespace = 99999
end if
End Function
%>
```

It's pretty easy to see what this is doing: it loops through all the drives on the machine, checks to see that they're hard drives and writes some output if the space left is less than 1Gb. That `'d.isready'` call is important, as the `FileSystemObject` considers it an error to read the drive type of a CD-ROM if there isn't a CD in the drive. Silly, but easily coded around.

Note that this ASP script outputs plain ASCII text rather than HTML, as there are no



A No HTML formatting tags mean that a browser shows everything on one line.

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Golden rules for using databases with ASP

We've had several emails from people suffering from the dreaded ASP0115 error on their database-enabled Web sites, and wondering how they can cure it. In our experience, 95 per cent of these cases can be solved by following these two simple rules:

- 1 Whenever you instantiate an object using the SET command, always release it by using myObj = nothing when you've

finished with it.

- 2 Whenever you open something, make sure you close it. This applies especially to connections and recordsets.

Yes, both of these should be done automatically when leaving a page, but trust us - if you want to avoid those mysterious ASP0115 errors, follow these rules like your life depends on them.

<HTML>, <HEAD> or <BODY> tags, and lines are terminated with carriage return/line feed rather than
 or <P>. We do it this way because it makes it easier to process using our content-checking techniques, the code for which would be something along these lines:

```
del diskpace.txt
wwwget -a http://www.internet.site/freespace.asp
diskpace.txt
find " " content.txt
goto d%ERRORLEVEL%
:d0
echo disk space problems found
blat diskpace.txt -server mail.isp.com.au -t
user@sms.genie.com.au -s disk_space
:d1
```

What this does is request a copy of the page using wwwget, then uses Find to search for the " " character. If one is spotted we know there's a disk space problem on at least one drive, so an alert message is sent.

You may have servers within your Web-hosting facility that don't actually have Web servers running on them - perhaps database servers or for controlling authentication. You might also have some Web servers running IIS3 rather than IIS4, and the FileSystem-Object within IIS3 won't be able to run this

code. So what are the alternatives available? Well, if you stick to the rules laid out, there are two main choices. One option is to stay DOS-based by using the NET USE command to create a network drive, request its directory listing and pipe the results through FIND to extract the free space figure shown at the end. Then use the NET command to delete the network drive again. You may be thinking 'That's stupid. Why not just get a directory listing using a UNC-style path?' Unfortunately, that won't work, as an UNC-style directory listing tells you everything except the free space: another of those annoying hiccups that are easy to code around.

Another option would be to use the often-overlooked Performance Monitor facility built into NT. Many people think this is just a way to display pretty graphs of CPU utilisation and so forth, but look closely and you'll find two important features: you can connect to other machines on your network, and Performance Monitor has an alert facility you can use to launch an application if a particular counter goes above or below some pre-determined level. You can use this to trigger Blat! and raise an alert if free disk space drops too low.

While you're poking around inside Performance Monitor, you might also set a few more alerts; CPU over 90 per cent, for

example, or login errors.

However, both of these techniques only work on local networks, whereas the beauty of our server-side script solution is that it will work on a server on the other side of the world. To do that with network drives or Performance Monitor, you'd have to use something like PPTP to tunnel through to the remote LAN.

So there you have it, server monitoring on a

shoestring. For the sake of a few minutes setting up, you can rest assured that your e-commerce servers won't die through lack of disk space. It has to be said, there's a multitude of tools out there that do all of these tasks properly, and we'll cover some of these in a later issue. In the meantime, for the sake of our sanity, can we please consider the subject of DOS-based server monitoring closed?

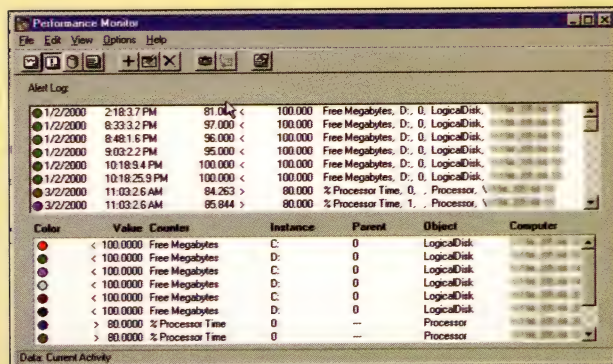
To use, move to the US

We're always hearing how the Internet is creating a global culture where national boundaries are becoming less significant, but there are still companies out on the Web that purport to be international and discriminate against non-American users. Mark came across a most blatant case recently with AOL and CompuServe while in Bermuda for the Orbis World Bridge Championships (doing his annual stint to set up and maintain their network and Internet connections).

The internal network was connected via a 128Kbits/sec frame relay circuit. One of the secretaries who wasn't on the LAN wanted to set up her computer to use AOL; she's often in different countries, so this seemed a good choice of ISP. After installation, the AOL software asks you to sign up by naming the country you're calling from - Bermuda wasn't there, so we chose America as the country code is the same. But the freephone number AOL provides wouldn't allow us to connect from Bermuda. So, we used the local ISP North Rock to connect to the Internet, then tried to carry out the sign-up procedure from there.

So far, so good: we were then offered a form to fill in which insisted on a US state code - as the lady in question lived in France, she didn't have one - and it didn't like her French telephone number either. We tried everything to change this form for something a little more European, even changing the regional settings on the computer to French, but nothing worked. Perhaps if it had been a French localised edition of Windows all might have been okay, but there are a lot of people out there who use their laptop set to a different language from the country they're living in. We tried CompuServe, but it came up with similar software and the same problems. How dare these companies market themselves as truly global when their definition of global seems to be the US and Canada?

A few days later, another example of this blinkered world view emerged. This time it was Microsoft's Hotmail system. This is a free email account accessible via your Web browser, and it also allows you to pick up mail from any other POP3 mail account you may have. Such a system is very useful at the World Championship, where there are some 40 computers available for people to pick up their



Don't forget that Performance Monitor has an alert facility.

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email and for members of the press to get their stories home. Using such a system saves the hassle of setting up email clients with roaming profiles. To use Hotmail, you simply fill in a form with your details.

Well, everything worked fine until a gentleman from The Netherlands needed to sign up. His name was Lex De Groot and when the form asked him what country he was from he replied 'The Netherlands'. When he finished the form and hit Submit, an error page told him that 'Last Name contains reserved or ineligible word. Please select another'. How many last names is he supposed to have? This is taking form validation to ridiculous extremes, as who is to say what a valid last name is? Perhaps this is a warning to anyone about to name a new baby: get it checked out by Microsoft to see if it's a 'valid' name, otherwise the child may be refused entry to cyberheaven. We got around the problem at the time simply by re-christening Lex De Groot as Lex De Sex.

At the tournament, the main Web server was sitting on the end of a 40Mbps/sec line, and the network of computers was connected via a 128Kbits/sec frame relay circuit to the Internet. One day, we lost Internet connectivity on the frame relay circuit, and after a few quick checks we made a frantic phone call to the ISP. Tom Coelho of North Rock was as helpful as ever, and we discovered that he could see our router but no machines on our network. We, however, could see the machines on the network and the router, but nothing on the Internet. This was most puzzling, and the usual technique of rebooting the router didn't help. In the end, rebooting one of the hubs on the network fixed the problem, though quite how we're still not sure.

You've been framed!

Anyone who's tried designing a Web site that requires accurate sizing of frames will no

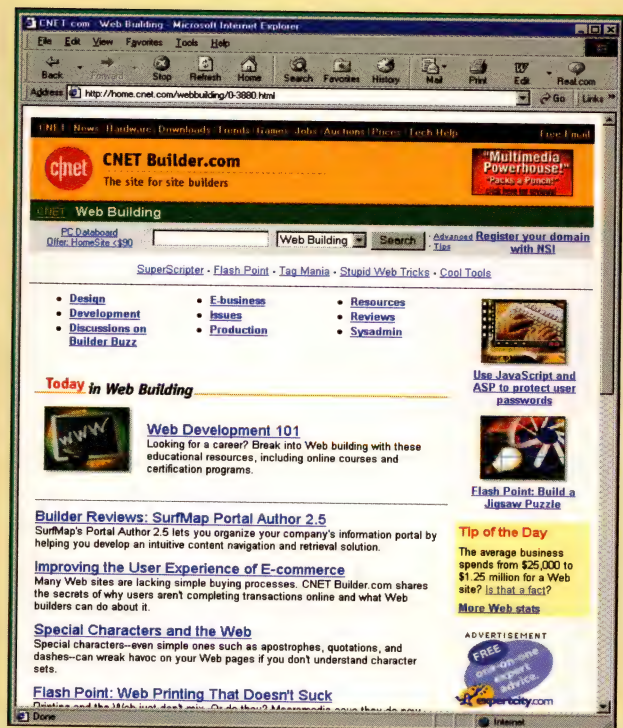
doubt have pulled their collective ponytails out after viewing the site in Netscape. To call the results curious is as polite as we can go. This is a well-known problem, and something we've lived with for years - ever since frames were invented in Netscape 2. Now, some light has been shed on the problem by Paul Anderson, technical editor for the excellent resource www.builder.com. In the article (www.builder.com/Authoring/Tagmania/120699/index.html) he describes how by trawling through the public domain source code for Netscape he was able to find out what was happening.

First, let us describe the problem in detail: if you set a frame to a specified pixel height or width in the HTML, Netscape won't display it at that size but at some close approximation. What is, in fact, happening is that Netscape is storing all frame sizes as percentages, even when they're defined explicitly in the HTML as pixels. Moreover, these percentages get stored as integers, so some precision is lost.

To take Paul's example, consider the HTML `<FRAMESET cols="250,*">`, which should produce two frames: one 250 pixels wide and the other taking up the rest of the Browser window. In a Browser maximised on an 800 x 600 screen, this will give us a maximum display width of 796 pixels because of the borders around the Browser window. What Netscape does now is to covert the 250 pixels to a percentage $[(250/796) \times 100 =$

$31.40703517588]$, which it rounds down to the integer 31. To display the frame in the browser window, Navigator takes this percentage value and works out the size of the frame $[(31 \times 796) / 100 = 246.76]$, which rounds to 246 pixels and not the 250 pixels you originally specified. The error will depend on the Browser window size, and the problem gets more confusing if you have borders around the frames. To quote Anderson: 'If you have borders, remove another two pixels off each frame dimension, plus the border value - plus one, divided by two and rounded down - per attached border. Got that?'

The only way to get around this problem is to open your Browser



www.builder.com - an excellent resource for the Web builder.

window with JavaScript and fix the size of the window. Now you know what effect the errors will have on your design and you can make the necessary correction. Just bear in mind that although the final size of your frame will be reduced by no more than one per cent of the total screen size, this can still mean a difference of ten pixels on a 1,024 screen, which is enough to mess up most designs. The reason for this curious browser behaviour is simply that the original code from Navigator 2 has never been changed since the idea of frames was first implemented. It seems this browser code repays serious study, and let's hope their server-side programs are maintained with a little more care.



You don't have a Microsoft-approved name.

Paul Ockenden

is technical director of a combined IT and marketing company. He specialises in knowing when to take his anorak off.

Mark Newton

is a consultant and programmer, specialising in Web development. He's never owned an anorak!



A display of colour

Paul Lynch shares the gossip he's heard about the new colour Palm IIIc, and he considers the advantages of a leather outfit.

By now you've probably read our review of the new colour Palm IIIc (*issue 29, p98*). Is it worth the upgrade, especially when so many of you are still agonising about upgrading to a Palm V? Colour display apart, the Palm IIIc does offer a spec much like that of the Palm Vx, with 8Mb of RAM and a Lithium Ion rechargeable battery. As for the colour screen itself, it's made for Palm by Sharp and it seems clear enough, with a wide viewing angle. However, I can't yet vouch for how legible it will be in bright sunlight, where most other colour screens suffer badly.

PalmOS 3.5 adds more than just colour support, including context-sensitive menu bars, and HotSync performance is said to have improved significantly, with Palm claiming it should be twice as fast. There are some bundled additional third-party applications, including AvantGo, a JPEG viewer, AlbumToGo from ClubPhoto, and the games Gammon from Whitehorse and PowerOne from Infinity Softworks.

Palm Computing has, in the past, made derisory references to the colour screens on Windows CE products, pointing out that movie players aren't exactly a mainstream feature for PDAs, but I expect it to eat those words and that a colour QuickTime player could be available very soon for PalmOS. I'll be interested to see if the concept of demoware (that is, features only of use in demos and not for real usage) will catch on at Palm.



A PalmOS 3.5 sacrifices battery life and daylight visibility for colour.

Compared with the Casio E-105, the Palm IIIc is smaller and lighter, and its planned \$899 price should scrape in below the Casio's price.

Personally, I'll wait for a colour Palm V equivalent before moving up, unless enough colour games are released to make the IIIc compelling. I don't consider colour alone to be sufficient compensation for reduced battery life and daylight visibility. However, I'll be upgrading to PalmOS 3.5 for its other features, just as soon as it's released for other Palm machines.

Hell for leather

Leather is a remarkably useful fabric. It looks

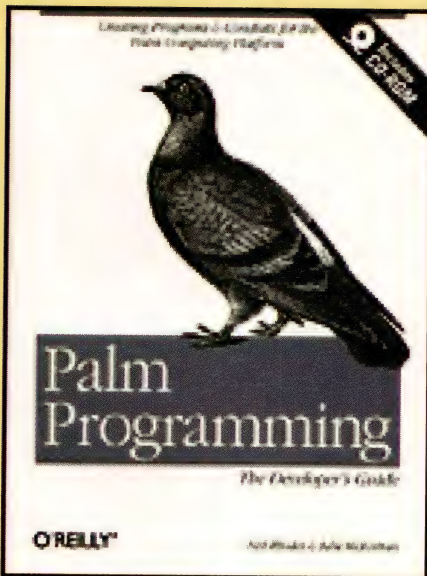
good, takes dyes well, is long lasting, breathable and has excellent abrasion resistance. What's more, it improves with age, as worn leather looks even more interesting. All of which makes it excellent for fashion clothing, protective gear, for fetishists and for pocket-sized cases for gadgets. Its only negative qualities are that it tends to mildew in damp climates, and that it's expensive compared with plastic. Whenever I come across a good-quality PDA case, it's invariably leather - not plastic or metal - and I regard the supply of a real leather case with a machine as a mark of quality.

However, manufacturers are making it hard to determine whether a case really is leather or not, and this isn't helped by the number of inaccurate identifications in magazine reviews. So just

for the record: the PalmPilot Professional came with a plastic, leather-look vinyl case; the flap cover supplied with the Palm V was real leather; and the Psion Series 7 and netBook both have a real leather panel in their casing. The Palm V was the hardest to be sure of, as it uses a thin and heavily processed leather skin over a card backing, much the same way that leather-pattern printed vinyl is used.

Psion training CD

There used to be heaps of books about using and programming Psion organisers,



A The new guide is easy to follow.

from the LZ64 to the Series 3, but with the Series 5 this supply of material seems to have dried up. There are books on Windows CE and Palm, but none for Psion. Steve Litchfield's 3-Lib Training CD fills that gap. This CD runs on Windows PCs using InfoCourier and the Lotus ScreenCam97 program, and it includes 53 movies lasting a total of four hours, covering topics including EPOC, built-in applications, programming, PsiWin, Internet applications and third-party applications (Money and PsiMapper/GB).

It runs from the CD and doesn't require anything to be installed on your hard disk. Steve talks you through all of the programs using the Emulator, making reference to the Series 5, 5mx and 7 models. A minor nuisance is that the sound distorts easily, even through my Cambridge SoundWorks 5.1 speakers. However, the scripting and presentation are up to professional standards, and it makes a pleasant change to have a presenter as knowledgeable as Steve speaking his own words, rather than some actor, ignorant of the subject, reading from a script.

Palm development book

Following the launch last June of David Pogue's *PalmPilot: The Ultimate Guide*, a useful introduction to Palm machines for end users, O'Reilly continues its concentrated effort on Palm Computing with *Palm Programming: The Developer's Guide*, by Neil Rhodes and Julie McKeenan. The new book is about developing for PalmOS using the official development environment, MetroWerk's CodeWarrior, and it concentrates on the C++ code itself rather than the environment, so it should be equally useful for developers using Windows or Macintosh versions of CodeWarrior. However, it only gives a glancing mention to other tools for PalmOS, and isn't suitable for developers using CASL, PocketC or Satellite Forms.

The book is written in O'Reilly's admirably-authoritative, yet easy-to-read, house style, without irrelevant digressions. My understanding is that Palm Computing plans to adopt it as the official developer's tutorial. A CD containing all the sample code used in the book is included, plus CodeWarrior Lite and the gcc developer resources. See <http://palmpilot.ora.com>

SFCave

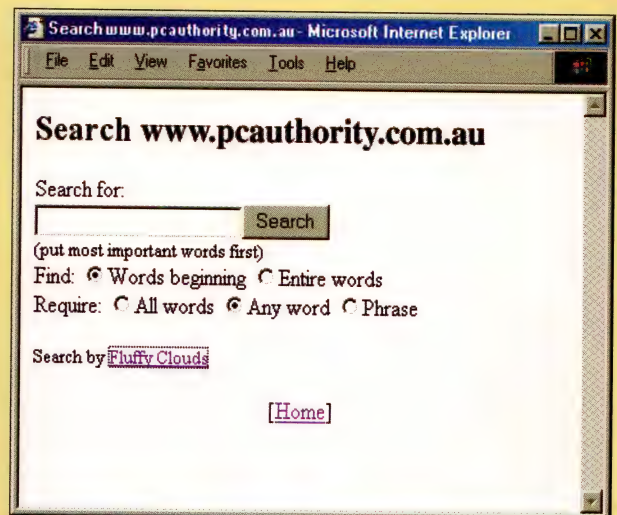
I keep on trying to write about the addictive game SFCave, but somehow it never quite makes it to the top of the pile. It's a very simple scenario: you press on any button to make the ribbon move upwards, and release the button to make it go down, and the ribbon accelerates the longer you keep the button pressed or released. The trick to getting high scores is to be sensitive enough on the buttons to keep the ribbon moving in a straight line. It's not DragonBane, PocketRogue or even Solitaire, but SFCave is still an

excellent distraction. For more information, check out www.bekkoame.ne.jp/~sunflat/pilot/

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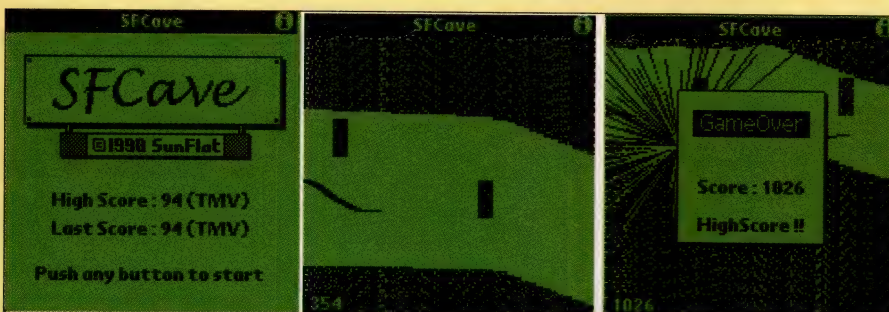
Last month I was explaining what server facilities are required to support a good mobile communications environment, and deliberately looking for 'free' solutions as alternatives to the popular Microsoft BackOffice suite. On our own Web server, I keep hierarchies of product and project documentation in HTML, and while good indexes make this mass of text easy to navigate, I'd rather be able to search for content by word.

Friends recently recommended I try the rather strangely-named Fluffy Search (www.fluffy.co.uk/), which will index your entire site, or just parts if you




A Fluffy Search can index and search words as you wish.

prefer. And it highlights your search words after you follow a link, which makes it extremely useful. You can embed a simple search form into a Web page, or provide a link to a full search page with additional options. There are some problems in building an index for really large sites, as Fluffy Search wants to build the index entirely in memory before writing it out, but typical medium-scale sites shouldn't present a problem.



A Get hooked but not caught on the racing ribbons.



Paul Lynch

Runs a company that provides services and software for NeXTStep, Apple's new OS, as well as intranets and ISDN.



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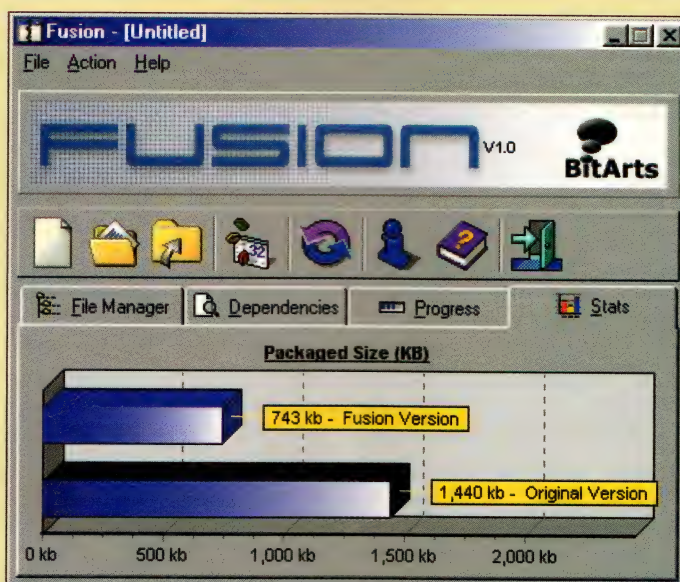
Blush-free VB

Dave Jewell finds relief for embarrassed VB programmers and finds a way of creating integrated Office solutions without using VBA.

Let's be honest, programming in Visual Basic doesn't carry the kudos associated with development in C++ or Delphi. I'm not sure whether it's just the lack of pointers, the need for that great run-time DLL, or the fact that the B in Basic originally stood for 'Beginners', but there's always a certain embarrassment about owning up to being a VB developer.

If this is how you feel then I bring you tidings of great joy, because a British software company called BitArts (www.bitarts.com) has recently released a new EXE file compressor called Fusion. Nothing new there, I hear you cry, and indeed I've reviewed various EXE compressors from time to time, including the venerable Shrinker and the recent ASPack utility. But it turns out that Fusion adds an interesting twist to the EXE file-compression business: in the words of the BitArts Web site, it 'makes your VB programs look like they're developed in C++'. In a nutshell, Fusion allows you to compress your application's executable, and also any supplementary DLLs or OCX files it requires, and that includes the VB run-time DLL itself. All the required dependencies get 'wrapped' inside a single, directly-executable EXE file, which looks like a standalone program created by one of those professional development systems. Now you can see why the product is called Fusion.

To get some feel for the overhead introduced by using Fusion, I created a do-nothing program using VB 6 and tried to 'fuse' it with `msvbvm60.dll`, Microsoft's 1.38Mb run-time library for VB 6. However, my initial attempt was rejected, because Fusion will only work with EXE files that are at least 20Kb in



Fusion - an innovative new EXE compressor - enables you to embed your application, ancillary DLLs and OCX files into a single executable.

size. So I added a bitmap to my sacrificial executable and tried again. This time, I ended up with a 56Kb executable, which I fed into Fusion. One of the neat things about Fusion is the way it automatically scans the executable to determine which dependencies it has, and this works not only for VB run-time files and OCXes, but also with Delphi/C++ Builder packages.

In this case, Fusion instantly detected that `msvbvm60.dll` was required and automatically added it to the list of dependencies - if you want, you can manually remove and add files to the dependency list before creating your fused executable. I just lit the blue touch-paper and retired, whereupon Fusion spat out a single 743Kb EXE file. This is impressive when you consider that the file contains the original executable, the Microsoft run-time code and the Fusion loader, which is responsible for decompressing items as they're loaded into memory.

A couple of years back, a certain David Moss of this parish asked me about writing some sort of setup/install program using VB, and an issue then was whether or not the necessary VB run-time already existed on the target system. One way to resolve this is to simply distribute `msvbvm60.dll`, or whatever, on the distribution media in the same directory as the install program, but thanks to Fusion an even neater option is to create a standalone executable, and nobody need ever know your program was written in VB.

BitArts points out that not only is your program compressed, but it's encrypted too, and this obviously makes life harder for hackers to pick apart your program. Speaking of which, the supplied Fusion executable is packaged using itself,

if you see what I mean. You can download a fully-functional trial version of Fusion from the company's Web site - it works just like the full version, except that it will only create EXE files that have a fixed name. If you try and alter the name of the file, it will refuse to run. Unlocking it via a special key supplied removes this restriction and gives you the full version.

You're probably wondering how Fusion's support for OCX files works. Basically, the loader code inside the fused executable automatically registers the OCX control on the fly, before the actual program needs it. The manufacturer states that Fusion prevents dependency version conflicts - DLL hell to you and me - because the required DLLs and OCXes are sealed up inside the delivered executable. This means the program will only ever use its own private dependencies: a similar concept exists in Windows 2000 called 'side-by-side versioning'.

Fusion is written using Delphi and you

might recognise a TChart component doing sterling service in the accompanying screen shot (whatever would we do without David Berneda and the wonderful software from www.teemach.com?). Fusion will also shrink Delphi and C++ executables, but for VB programmers who'd rather not have it known it's a real godsend.

Building integrated Office applications

No doubt you're aware that Microsoft's Office applications are all effectively COM servers; that is, they're written in such a way that you can pull their strings and press their buttons from another application using Office Automation, and you can use the built-in VBA as the basis for an integrated Office solution. Now VBA is wonderful, but those who prefer a programming language with more clout may be interested in checking out the recently released OfficePartner from DeVries Data Systems at www.dvdata.com

OfficePartner is written in Delphi Pascal, meaning you can use it from both Delphi and C++ Builder. In essence, it's a set of VCL components that enables your application to interact with major components of Microsoft Office in a way that's both natural and intuitive for VCL programmers. Everything is done using the familiar properties, events and methods paradigm that Delphi and C++ Builder programmers are used to.

When I received it, OfficePartner 1.5 was still in beta, so I had to manually build the various packages, install everything into Delphi, integrate the online help into the IDE and so forth. However, I understand that a full setup program will be available for version 1.5 by the time you read this. In this mini-review I'll take a look at the beta code and give you an idea of how easy it is to create an integrated Office solution based around Delphi or C++ Builder.

Once OfficePartner is installed, you'll find

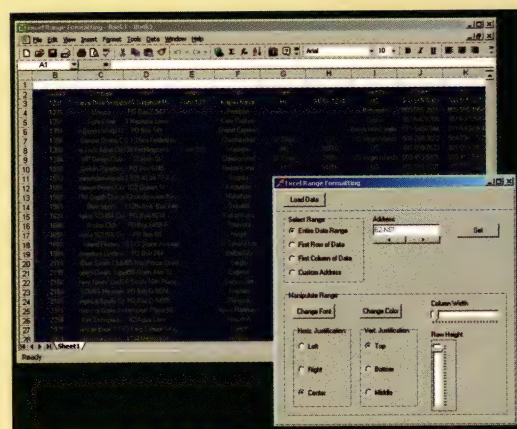
eight new items on the Delphi Component palette, which are, in order of appearance: TDvExcel, TDvWord, TDvOutlook, TDvPowerPoint, TDvEventModel, TDvDatasetModel, TDvContactsDataSet and TDvAssistant.

The first four components correspond to the 'wrappers' needed to interact with the four principal Office applications. OfficePartner works with Delphi versions 3, 4 and 5 and C++ Builder 3 and 4. (NB: At time of writing, Borland has just announced C++ Builder 5 and I anticipate that the final version of OfficePartner will also offer support for this new development system.) In terms of applications, Word, Outlook, Excel and PowerPoint are supported on both Office 97 and Office 2000, the only exception being Outlook 97, which won't work with OfficePartner. According to DeVries, a major benefit of OfficePartner is the way you can deploy integrated Office solutions without worrying about which mix of Office applications and operating systems you'll be working with.

Returning to the list of OfficePartner components mentioned above, the TDvDatasetModel component provides an implementation of the IDvModel interface, which is defined within OfficePartner. This interface acts as a go-between, allowing a VCL dataset to be used to populate a Word table or a range of cells in Excel. The TDvEventModel component implements the same interface, but this time provides three events that can be used to feed the data to Word or Excel. These handlers allow the Office applications to query the number of columns in the dataset, the name of each column, and the data contained within each cell. By using a TDvEventModel component in your application, you can easily populate Excel ranges and Word tables programmatically, rather than having to create a specific dataset for each situation.

Finally, the TDvContactsDataSet component is a derivative of the familiar TDataSet class, which can be used to access Outlook's Contact Manager database. The TDvAssistant component provides access to the Office Assistant - the animated paper clip and his mates - and won't be discussed here any further.

The four OfficePartner components that interact with the principal Office applications each have a Connected property that determines whether or

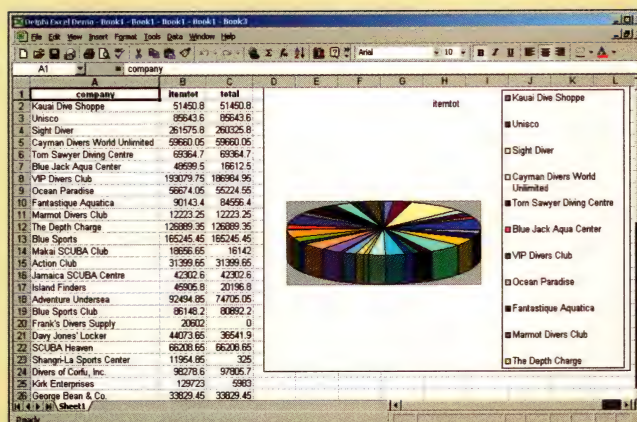


A Excel showing how OfficePartner allows you to set custom range formatting information directly from Delphi.

not they're currently in communication with the relevant application. If not, you can set up a host of persistent properties in the component, and these changes will only be reflected in the Office program when you set Connected to True. Thus, it's possible to store, for example, a lot of information about a Word document as part of a Delphi or C++ Builder form, effectively 'rendering' this information only after you connect to Word. Similarly, there's a Visible property that determines whether or not the associated Office application is visible while you work with the various OfficePartner components.

Microsoft's Office 97/2000 object model is very complex, comprising thousands of methods and class definitions, and DeVries is keen to point out that OfficePartner doesn't attempt to encapsulate absolutely everything in VCL terms. Rather, it concentrates on what it considers to be the most important functionality. You won't, for example, find an encapsulation of the functionality needed to insert a URL link directly into a Word document, though you can get around such limitations by directly accessing the 'raw' COM interfaces involved.

Some of these concepts are illustrated by the sample form code included on this month's cover CD. This form includes a TDvWord component called DvWord1. When the first button is clicked, it causes the Button1Click event handler to be called, which sets the Connected property of the TDvWord component to True. Since a connection is established with Word at this point, any property changes to the component will be immediately reflected in Word. Setting the Visible property to True makes Word appear on-screen. The TDvWord component contains a property called Documents, which is organised as a collection. This collection represents all the open documents within Word, each member of the collection being of type



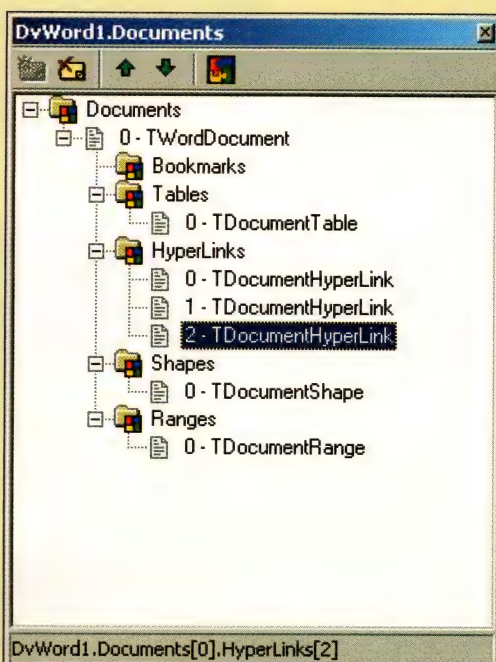
A A Delphi TDataSet, sent courtesy of OfficePartner, which also instructed Excel to display the chart shown.

TWordDocument, a class that encapsulates a single document.

Using this natural, VCL-like approach, I can call the Add method on the collection class, which will create a new Word document, add it to the collection and return the instance variable of the new document. Since Word is connected and visible at this point, you'll see it instantly reflect the change in its window. Finally, the Button1Click handler calls the Insert method on the new document to add some text.

The Button2Click event handler is more involved, demonstrating how to get access to functionality that isn't encapsulated directly by OfficePartner. When you click the appropriate button, it adds a hyperlink (set to www.dvdata.com, the Web site of DeVries) to the Word document. This is done by using the 'as _Document' construction, which gives you a pointer to the raw COM interface. You'll notice three OleVariant variables in this code snippet, which is par for the course when working with COM direct.

The Documents collection I mentioned earlier is actually a special nested collection, whereby each document contains other categories of information such as Tables, Hyperlinks, Bookmarks and Shapes. OfficePartner includes a special Property editor, which you can use to manipulate this nested collection at design time. I've only scratched the surface of what OfficePartner can do here, but you can download backgrounders, white papers and demo program from the DeVries Web site if you want more information.



A The various Office apps wrappers use a nested property collection to implement all the entities contained within a document.

Undocumented Windows 95, 98 and 2000

One of my favourite Web sites is www.geocities.com/SiliconValley/4942/contents.html, which doesn't get updated too often, but when it does is always interesting. This is assuming - like me - you enjoy peeking under the hood of Windows and learning about all the stuff Microsoft doesn't see fit to tell you about. Remember when Microsoft tried to tell us that it doesn't use undocumented calls in its own applications? Well, it does, and this particular site is dedicated to exposing all the undocumented stuff contained inside shell32.dll.

This Web site is entitled Undocumented Windows 95, so you may be forgiven for thinking that it's rather out of date, but not so: much of the material here is equally relevant to Windows 98, 2000 and the later implementations of NT 4. There are platform-specific differences you need to be aware of, the most important being that anywhere a simple character string is passed in Windows 95/98, a Unicode string will be expected in NT 4 and Windows 2000 - as pointed out by James Holderness, the author of the site.

If you're cunning, it's possible to code your way around this without introducing lots of IF statements into your code. For example, in Delphi Pascal you might write a function that takes an ordinary PChar as a parameter and returns another PChar as result: under Windows 95/98 it would simply return its argument, but under NT/Windows 2000 it would convert the passed input argument into its Unicode equivalent, store it in a pool of statically-allocated string buffers and return a pointer to the buffer. If you declare the undocumented shell32.dll routines as taking a simple PChar, the compiler will neither know nor care that a Unicode string is being passed when running under NT. Similar considerations apply when it comes to retrieving the value of a string that's been returned from the OS.

So what does James talk about? If you've ever wondered how to get a bitmapped menu such as the Start menu used by Windows Explorer, look no further. In the section entitled Shell File Menus, James explains the care and feeding of the secret API calls that create those nice-looking graphical 'stripes' alongside a menu. Eye candy aside, the real point about these function calls is that they can take a pointer to a directory location and

Windows 95	
Contents	
Shell Common Dialogs	October 1st, 1998 28,356 bytes
Undocumented Common Dialogs provided by the system shell.	
Shell Item Identifiers	August 19th, 1998 28,811 bytes
All the functions you'll ever need for manipulating ITEMIDLISTs.	
Shell Notifications	May 6th, 1998 21,634 bytes
The secret to receiving notifications sent by SHChangeNotify.	
Dynamic Array Routines	October 11th, 1998 33,745 bytes
A set of functions for handling dynamically sizeable arrays.	
The Shell Icon Cache	June 10th, 1998 30,119 bytes
The internal workings of the Shell Icon Cache or System Imagelist.	
MRU Lists	June 20th, 1998 23,330 bytes
A set of functions for maintaining Most-Recently-Used lists.	
Cabinet Window Messages	August 9th, 1998 27,311 bytes
Various messages for controlling Explorer folder windows.	
Shell File Menus	December 14th, 1998 41,794 bytes
Special-purpose menus with color icons, bitmap borders and more.	
Path Manipulation Routines	November 3rd, 1999 41,810 bytes
Some useful path manipulation functions similar to those in SHLWAPI.DLL.	
Namespace Extensions	???
The easy way to create a fully functional shell namespace extension.	
BACK TO HOME	

A This Web site is full of juicy morsels that are relevant to Windows 95/98/2000 and NT.

automatically convert the files and folders it contains into an equivalent menu structure, which is exactly how the Windows Start menu does its stuff. Thus, your Favorites Start menu entry generally corresponds to the contents of C:\Windows\Favorites, your Programs Start menu entry corresponds to the contents of the C:\Windows\Start Menu\Programs folder, and so forth. James explains how to make all of these goodies available in your own applications, either as pop-up or regular menus.

He also discusses the shell's Icon cache, which keeps track of all the icons of known file types. This is the cache Windows 95/98 seems to corrupt at least two or three times a day, replacing all your familiar Desktop icons with strange new ones. There's also a set of routines for manipulating pathnames, easy instructions on how to get access to the shell's (Un)common dialogs, as opposed to the common ones that you know about, and much more. Do check out the site.



Dave Jewell

Freelance journalist, Windows consultant and programmer specialising in low-level system programming. Author of Instant Delphi.

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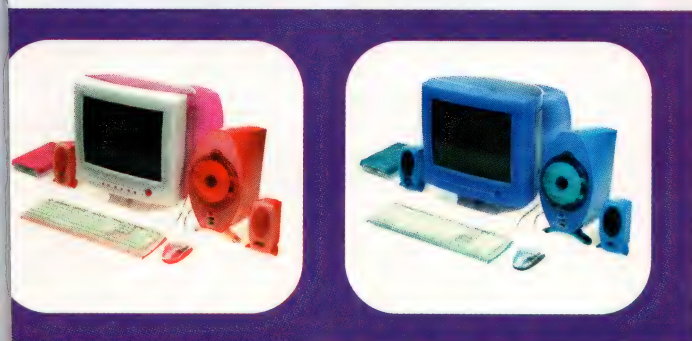
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Wailing on the Web

The Internet is likely to become the major means of distributing music. **Brian Heywood** can help you jump on the bandwagon.

There's been a lot of hype recently about using MP3 (MPEG Layer 3) encoding to put your music onto the Web. In fact, companies have been rushing to put unsigned or otherwise unpublished music on the Internet, and some of them are even offering money for this privilege. For their part, the major record companies are taking the net very seriously, as demonstrated by the energy they're putting into curbing pirate MP3 audio files and generally trying to work out how to make a fairly honest buck from the Internet.

You don't have to be a major player in the music business to take advantage of the Internet, and anyone who has a Web site can 'publish' their music on it. The trick isn't technical; it lies in getting paid for the effort you've put into your finely crafted musical works once you decide to distribute 'product' using the wonders of modern comms technology.

The software industry provides good models for the various ways you can sell via the Web: mail order, pay-and-download, shareware and even freeware are all ways of distributing your music to the masses. But unless you can get Customer Not Present (CNP) credit card handling status, you won't be able to take advantage of the worldwide nature of the Web, except for pure freeware. The important point is that the model you choose should determine the way you present your audio files.

First decide which file format to use for encoding your audio files. I'm only going to

consider digital audio files here, as they give you most control over how the music is presented. MIDI and other types of files have certain advantages when transferring music onto the Web, but they can sound awful if the listener's sound card or player software aren't up to scratch. Digital audio files like WAV represent the lowest common denominator in terms of compatibility and are almost universally acceptable, albeit with certain caveats. MP3 files are the obvious choice, as they're compact, of reasonable quality and can be streamed, which means you can play them as they download from the net, rather than

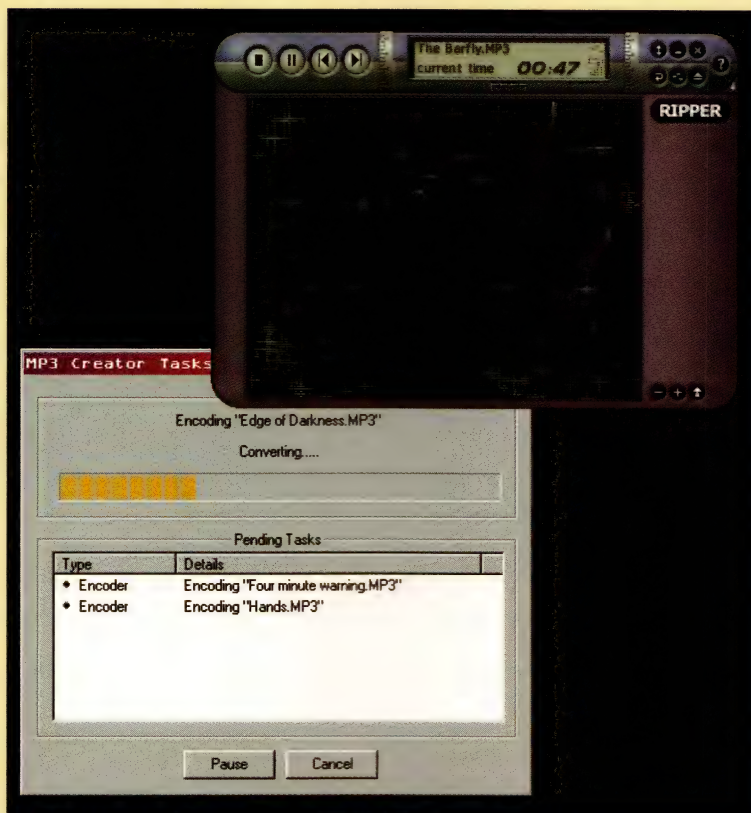
having to download first and play later.

It's not surprising that MP3 is becoming the most popular file format on the Web, as it was designed to shift large amounts of data (moving images actually) using the minimum of bandwidth. There are formats that can give better perceived quality for the same bandwidth, but these tend to be proprietary and force you to lock yourself into the features that their vendor is prepared to provide. This may be acceptable to Apple Mac users, but PC and Unix/Linux users tend to be more independently inclined. MP3 is a more open standard, and consequently has attracted a host of shareware and freeware utilities and players. As MPEG is an official standard from the Motion Picture Experts Group, it's well supported by the major manufacturers as well; for

instance, the Windows Media Player can handle MP3 files.

Com-pressing matters

Once you've chosen your file format you have to decide how heavily to compress your audio - the trade-off being between the size of the resulting file and the quality of the audio. Higher-quality files take longer to download but give better results at the far end, while smaller files take less time and might be streamable, which gives more instant gratification to the listener. This last point is



A Playing and creating MP3 audio files is all the rage.

Back to basics - unbaking a cake

I'm often asked whether it's possible to copy a pre-recorded music track, say off a CD, and then split it up into its individual instruments and vocals. There are, surprisingly, a number of legitimate reasons why you might want to do this; for instance, to use the de-mixed track as a learning tool or to create your own music minus one track for practising. Given the high quality of MIDI files nowadays - especially if you're using a XG-based sound card - this isn't such a daft question if you're not familiar with the underlying technology. But as far as I can see, the operation is technically impossible at the moment, and may well remain so for the foreseeable future.

The analogy I use is to compare it to separating the original ingredients of a cake after it's been baked: to extract individual instrument sounds from a mix-down, the software would need to know the exact frequency components

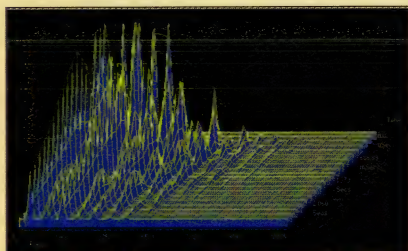
and relative levels of each instrument, but if it knew this there'd be no need to extract them. Imagine trying to extract a raw egg from a baked cake and trying to get it back into its shell.

There are programs that can extract just pitch and/or rhythmic information from an audio file, but only when there's a single instrument present - and the ones I've tried don't even do this well. They work by trying to extract the fundamental frequency of the sound, then performing a pitch calculation to work out the actual notes played. This is no trivial task, because the instruments might be slightly out of tune, or the rhythm subtly altered to give expression or feel.

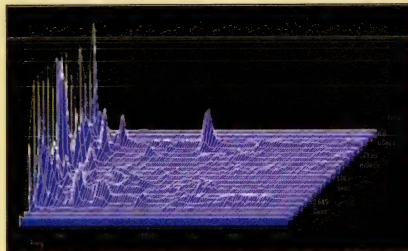
The ingredients of a mix could be simple, but when added together in the frequency domain you get what looks like a sticky mess. You can sometimes remove instruments or a vocal from a stereo mix, using a technique that relies on the

common practice of placing the lead vocal or solo instruments in the centre of the stereo image. This means that this signal is identical in each side of the stereo image, so by inverting the phase of each channel and mixing it with its opposite (that is, left with inverted right, right with inverted left) any instrument that's placed dead centre should disappear. This is simple to do with a decent digital audio editor, and there are hardware devices available for budding karaoke artists that do just this.

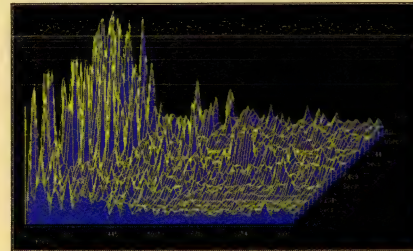
But there are two problems with this technique. First, any instrument in the centre of the mix will disappear, so you may lose the vocal and bass guitar and bass drum, giving you a tinny mix. Second, a vocal track is likely to have stereo reverb to give it ambience, and since this is different on each channel it will remain and give the ghostly effect of the vocal being performed in a distant bathroom.



A An over-driven guitar has quite a simple harmonic structure.



A The voice is a bit more complicated, but is still quite structured.



A When everything is mixed together, all semblance of order goes out the window.

important, as you don't want to keep your listeners waiting when downloading your song.

The fall-off in quality as the data rate decreases depends on how clever your compression algorithm is, and this is what separates the free encoders from the ones you

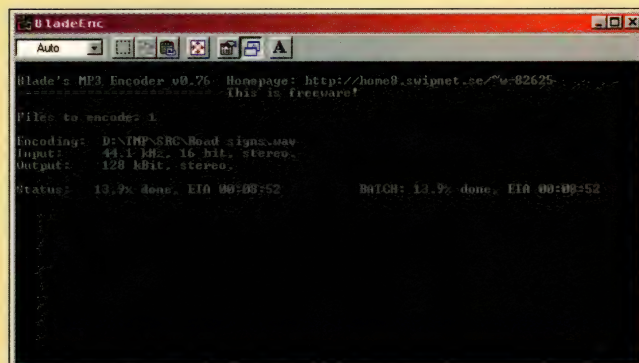
have to pay for. A lot of clever - and expensive - psycho-acoustics research goes into creating a good MP3 (or Real Audio) encoder, which is why companies like Xing and Opticom are so touchy about protecting their encoder technology. From my own experience, free

encoders give reasonable results at the higher data rates but produce strange-sounding artefacts at the lower rates, and won't encode at data rates low enough for streaming.

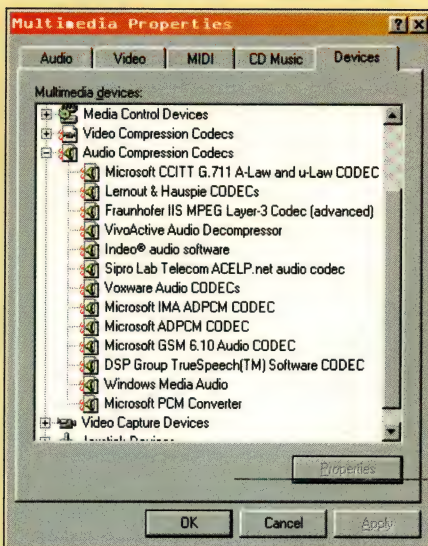
Perhaps surprisingly, the Microsoft MP3 encoder bundled with the Windows Media Author package is pretty good right down to streamable bandwidths, which is only surprising because

the whole package is available free for download from the Microsoft Web site at www.microsoft.com/windows/windowsmedia/en/download/default.asp. This package also lets you create Advanced Streaming Format (ASF) files that can do clever things in conjunction with a Windows Media server, but it can be used on any Web site. However, the Windows Media Player is probably the only player available for this type of file.

There are only two rates I use when creating MP3 audio files. Either I need to email a relatively high-quality audio file to a co-writer or co-producer, or else I want to put a sample of a track onto the Web for general download. For the former, I tend to use 56Kbits/sec, which gives a 25:1 compression ratio, reducing a three-minute sound clip to just over a megabyte of data. For Web download, I like to offer the option of streaming the audio, so I use a 16Kbits/sec



A BladeEnc might look like a DOS program, but it's a true 32-bit Windows app.



A List the codecs on your PC using the Multimedia Properties icon.

rate, which works fairly reliably for anyone using a 28.8K modem. If you're more interested in cramming a lot of tracks onto your hard disk or a CD-ROM, the standard rate seems to be 128Kbits/sec, which gives a compression ratio of 12:1 and means you can get 14 hours of music onto a standard 650Mb CD-R disc.

Free encoders

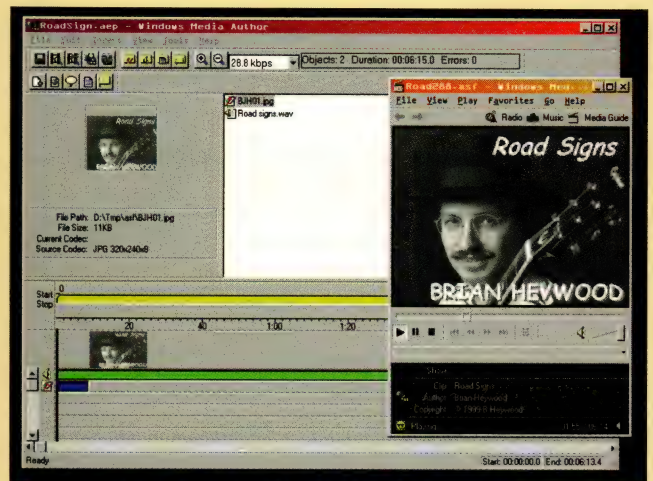
If you install the Microsoft Media Producer package, it updates your Windows audio compression codecs list with an MP3 encoder/decoder from the German research company Fraunhofer. It's not uncommon for multimedia apps to add to this list of codecs in Windows, so you should check occasionally to see what you have available by opening the Audio Compression Codecs branch on the Devices tab of the Multimedia Properties icon in the Control Panel.

You can't directly use a codec from the

media package, but you can usually create MP3 files from your WAV editor by selecting the ACM (Audio Compression Manager) file format from the Save As... menu option. This is convenient for individual files as you can use your favourite editor to do the work, but you may find that it becomes tedious when you have a lot of files to convert. One point to note is that the ACM option will probably by default save with the WAV extension, but you can edit this to say MP3 (or just rename it later) and any MP3 player should be able to handle the resulting file.

Dedicated MPEG audio converter apps let you process lists of files in batch mode, allowing you to convert a large number of files either as a background task or overnight. The Windows port of BladeEnc from Tord Jansson is the simplest user interface I've seen - it looks and behaves like a DOS program, but is a full 32-bit Windows app, albeit one that uses a command line interface. You simply drag the files you want to convert and drop them onto the BladeEnc icon and the program will chug through the lot, converting them to 125Kbits/sec MP3 files.

If you want to do anything more sophisticated, you have to start using the command line. Alternatively, you could use a Windows front end for Blade Encoder called RazorBlade (written by Holger Dors), which allows you to define the encoding parameters and output directory for a list of files. You can find BladeEnc at <http://bladeenc.mp3.no/> and RazorBlade at www.dors.de/RazorBlade/



A Use the free Microsoft Media Author software to create snazzy visuals to accompany your music.

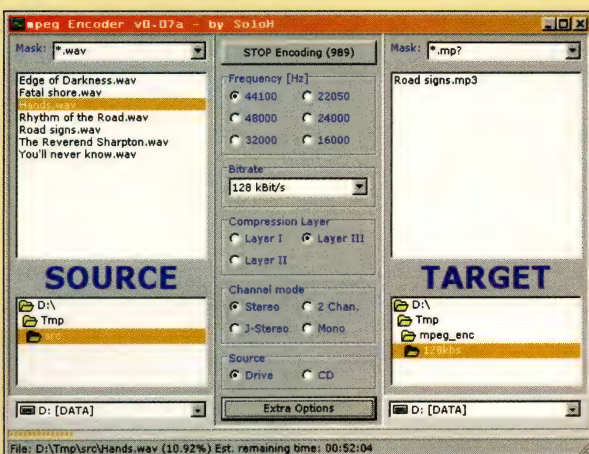
Two other free MP3

encoding apps I've looked at are mpegEncoder (www.euronet.nl/~soloh/mpegEnc/) and MP3 Creator (www2.buttonware.net/tymp3creator.html), both of which claim to be able to rip audio tracks from CD, although I could only get this feature to work in the latter. mpegEncoder is a straightforward list-based batch processor that can also create Layer 1, 2 and 3 audio MPEG files. It does the job, but is considerably slower than BladeEnc.

MP3 Creator is a cool-looking player/encoder, with a disco-style display, but it will only run if your Web browser's home page is set to a particular site on the Web. There are loads more encoders on the Web, although a lot of them seem to use the same core encoding software from ISO.

The ASP alternative

Notwithstanding the advantages of using an open standard like MPEG to get the most compatibility across various computer platforms, Microsoft's proprietary ASP development tools can give you some interesting options. For example, you can use the Windows Media Author app to add graphics to your audio track when you distribute audio on the Net. ASF is a combined video and audio format, and the Media Author software allows you to combine both media types into a single ASF file.



A mpegEncoder uses the same core code as Blade, but runs slower due to its Windows user interface.

The video element can contain still images as well as moving video, which means you can add graphics that display while the track plays: this could be as simple as a track name and copyright notice, or as sophisticated as a slide show that relates to the music/audio track. You can minimise the transfer overhead by not going overboard on the use of graphics.



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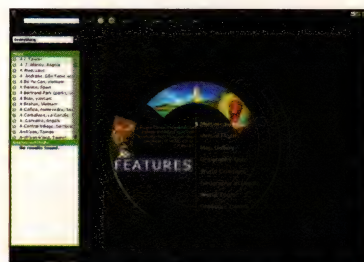
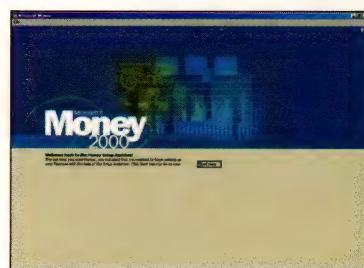
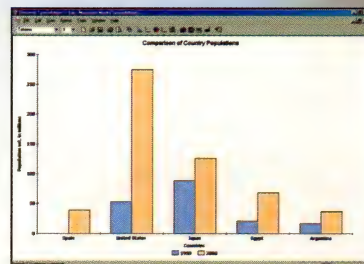
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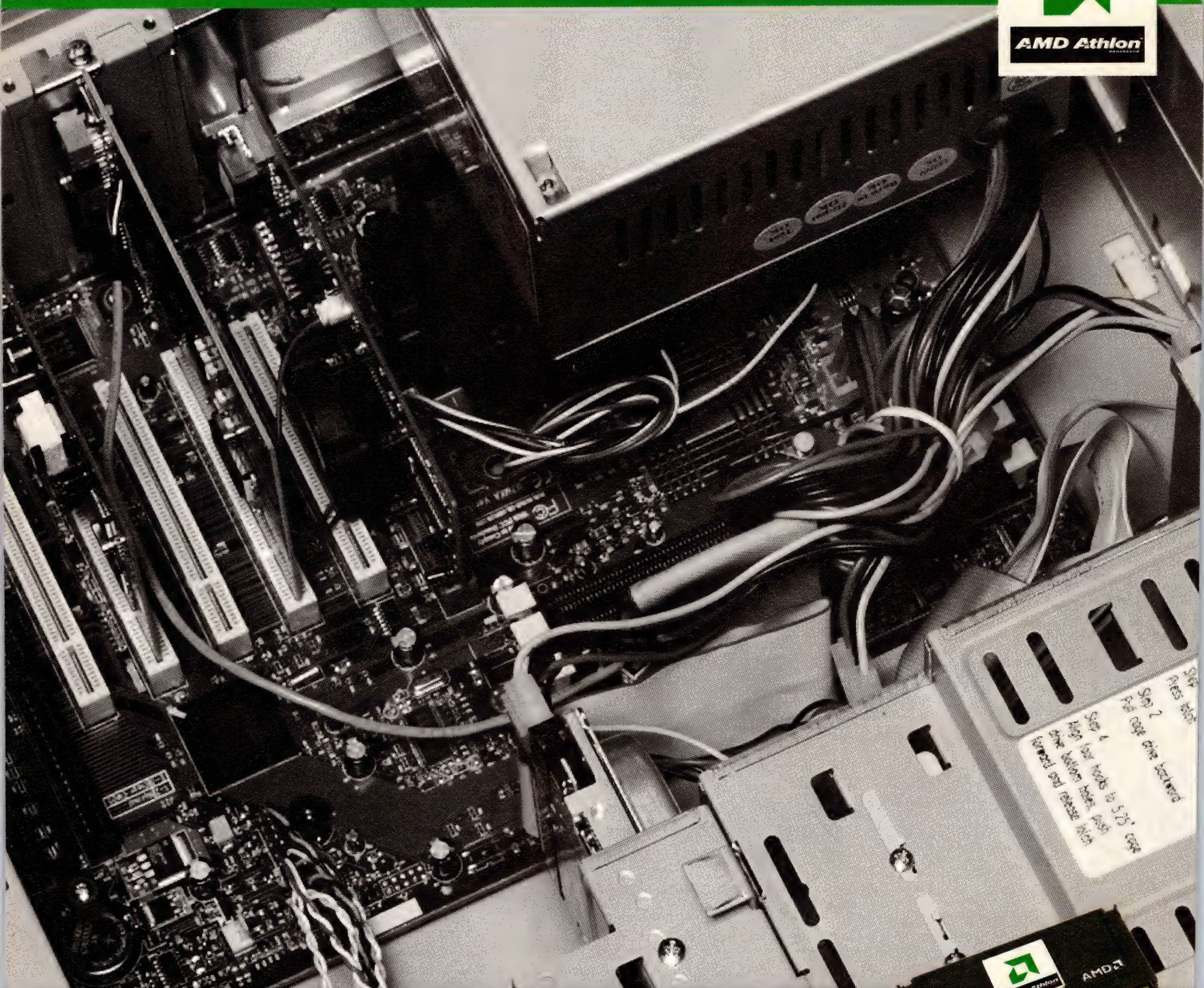
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A close-up photograph of an AMD Radeon HD 5870 graphics card. The card is black with a prominent white square logo in the center featuring the AMD logo and the text "AMD Radeon". To the right of the logo, the word "AMD" is printed in a large, stylized font. The card is shown at an angle, highlighting its metallic edges and cooling fins.

What's inside your PC?



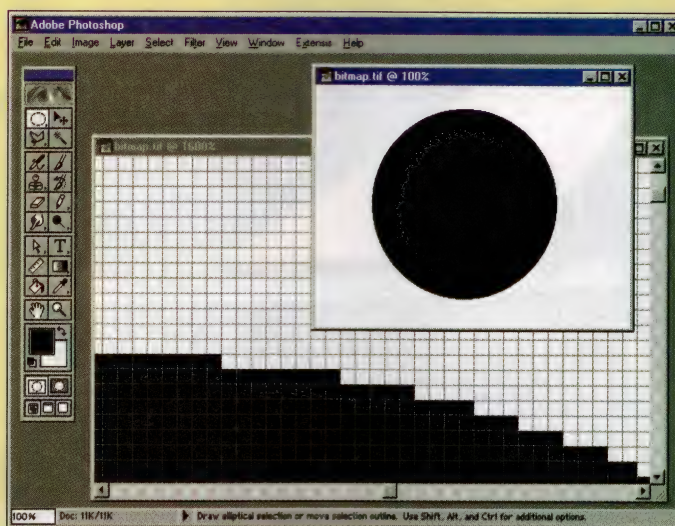
A bit of class

Tom Arah delves into bitmap files and demystifies the four main standards: BMP, TIFF, GIF and JPEG.

When you save a bitmap file, the sheer number of file types you'll be offered can be daunting. What exactly is the difference between a PNG, PCD, PSD and PDF - and does it matter? In fact, this question should remain irrelevant while you're still working on your image, because you should always save to your editor's native format to ensure you aren't throwing away information. However, images files are different from most other files - say, spreadsheets and databases - in that the data they contain typically can't remain specific to one application for ever; after all, an image only makes sense when it's seen by others.

This is where the various bitmap file standards come into play, because they enable the reliable exchange of graphical information between different applications and media. My message is simply: don't panic. Your Save As dialog might be bombarding you with 20 or 30 alternatives, but you really only need to know about four of them.

Before looking at these four formats in detail, it's worth going back to basics and explaining just what a bitmap file is. Essentially, a bitmap is an array of pixel values, so at its most basic a simple black and white bitmap of a circle, for example, is just a grid of squares or pixels where each pixel is either on or off; that is, black or white. The simplest file format capable of describing this requires a file header, with a few fixed fields defining such essentials as the width and height of the grid, and then, following this, the image data itself stored as a stream of single bits with 0 representing white and 1 black.



A Zooming in on a simple bitmap shows its true nature as a grid of pixel values.

BMP

Back in the days of black-and-white printers and monitors, such a simple format was all that was required to store bitmaps, Microsoft Paint's MSP being an example, but the advent of colour monitors changed all that. Once CGA, EGA and then VGA screens were capable of showing 16, 64 and 256 colours respectively, a simple on-off bitmap was no longer adequate. However, the solution was simple enough - just increase the bit-depth. Rather than storing one bit for each pixel value, you'd simply allocate more bits per pixel. With two bits you could define four colours, with three you could define eight, and by the time you reached eight bits, you had the necessary 256. Various bitmap file standards, such as PCX, emerged to support these new display-driven demands, but the most important one that survives today is Microsoft's BMP, the Windows native bitmap format.

What made the BMP format successful was its support for indexing through four- and eight-bit palettes. Rather than store all three

RGB values for each pixel, Microsoft added a palette (at first fixed, but later made customisable) to its BMP format, so that for each pixel only the index into this palette rather than the much longer RGB value need be stored. This look-up table approach is more efficient for handling eight-bit images with up to 256 colours, since each pixel can be stored in eight bits rather than 24. Microsoft was able to further optimise the BMP format by tying it even more closely to Windows' API, adding features such as control over which colours to dither when images are viewed on restricted colour displays.

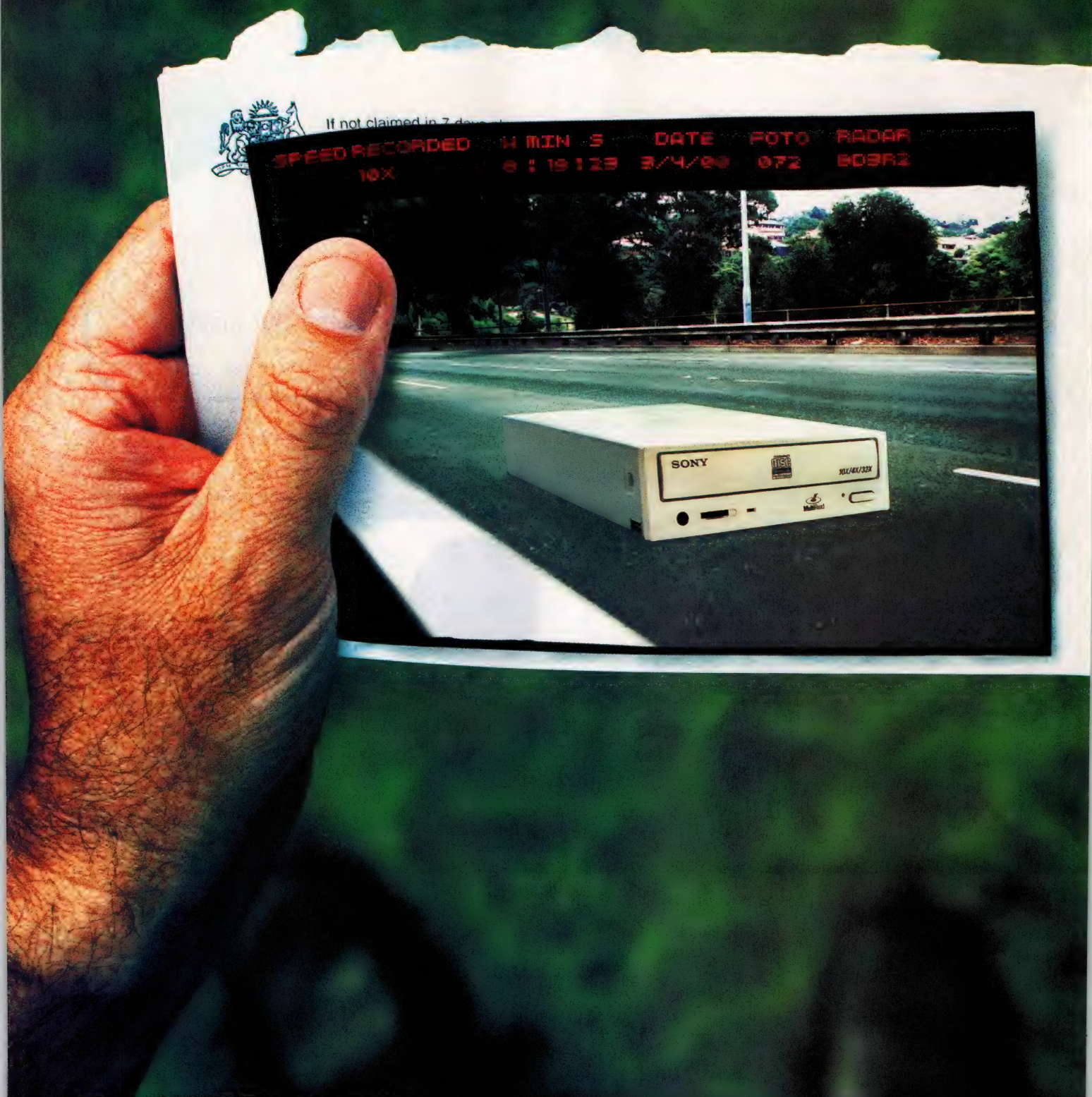
Such indexed bitmaps were ideal for images with limited

numbers of colours, but their advantage turned into a disadvantage once 24-bit displays and output devices became capable of reproducing photographic continuous tone colour. Now, to index each colour you'd need a palette of more than 16 million colours, so that even the tiniest 24-bit icon would require a massive built-in palette, while each indexed pixel value would be the same size as the RGB value it replaced. The obvious solution is simply to give up on indexing and store the actual RGB values.

This can be done in planar fashion, where the red, green and blue components are stored in separate areas (RRRRGGGGBBBB), but that means you can't actually discover the value of a particular pixel until you've read at least two-thirds of the file. A simpler layout is to store the information as rows or scan lines (RGRBGRBGRB), and this is the option most bitmap formats have adopted.

The Windows 2.x BMP format added support for 24-bit RGB colour in this way, and then the Windows 3.x version added basic

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compression and the Windows 95 version added colour management. Even so, BMP never took off as a universal 24-bit Truecolour standard, because it's inefficient for the most demanding tasks such as handling photographs and print output. Consider, for example, its compression scheme: the only compression BMP offers is Run Length Encoding (RLE), which works by locating repeated sequences and expressing them in just two bytes (so that 300 white pixels in a row could be represented as 300W). That works well for images like PC screen shots containing large areas of flat colour, but for the continuously varying tones of a scanned photograph it achieves almost no compression at all.

into tagged strips of multiple scan lines.

This doesn't sound that revolutionary, but it's crucial for handling the large files necessary for print work, as it allows for easy buffering and random access. In particular, it means that to load just the bottom of an image, for instance, the whole file needn't be read and held in memory. Other tags - and there are now more than 70 public and any number of customised private tags - are used for defining such features as the colour mode of the file and the choice of compression method.

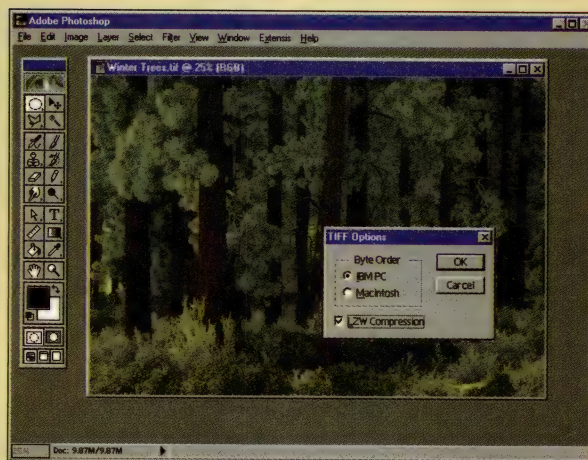
Originally, like the BMP, TIFF offered just a variation on RLE compression called PackBits, which is only efficient for indexed images, but with the 1988 release of TIFF version 5, optional support for LZW (Lempel-Ziv-Welch) compression was added. LZW is a substitutional or dictionary-based encoding algorithm that creates its own look-up dictionary on the fly. Patterns of data are identified in the data stream and matched to entries in the dictionary and, if there's no existing entry, a code phrase based on the substring is automatically added to the dictionary.

The easiest way to understand the difference between LZW and RLE is to imagine encoding this article: RLE encoding would only be able to compress consecutively repeated letters (like the twin 't's in letter), whereas LZW can compress any repeated combination of letters anywhere.

The flexibility of the TIFF was enhanced further with the 1992 release of the current version 6 specification, which adds support for tile-based storage. Here, the image data is split into columns, as well as rows. Furthermore, it added support for new colour spaces. The new tags allow for both 16-bit colour channels and also two completely new non-RGB colour spaces.

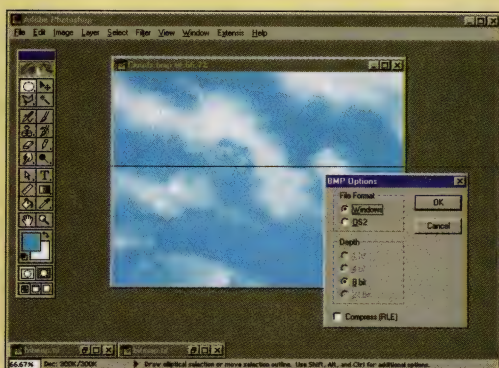
The first of these, YCbCr (more familiar as LAB), allows colours to be stored in a device-independent format, while the second is even more beneficial as it allows pixel values to be stored as 32-bit values made up from four channels - the ubiquitous CMYK format so essential for print work.

The TIFF's flexibility has undoubtedly created its success, but it's also its major weakness. The first problem is that there are so many



▲ The TIFF format's strength is its print-orientated flexibility.

'flavours' of TIFF now: if your application doesn't support LZW compression, for example, it will throw up a 'bad TIFF' report, and fact that the limitation isn't in the TIFF itself but in your application is little consolation. Perhaps the most common problem is an inability to read Mac-produced TIFFs on a PC (and vice versa), because of the byte order in which data is stored. The very first field in the TIFF image file header is the byte order identifier, so really application programmers have no excuse for letting this happen. But even so, it's a serious drawback of this most important print-based bitmap file standard that so many programs refuse to open its files. The only solution is to stick to professional applications, which can't afford not to support the full TIFF specification.



▲ The BMP's indexed format and basic compression is built for fast display.

TIFF

BMP remains an important format for fast and efficient screen display, but a better standard was required for print-based work in the burgeoning computer-based publishing industry. The format that came to fill this role was TIFF (tagged image file format). What made the TIFF so different was its tag-based file structure. Where a BMP file is built on a fixed header with fixed fields followed by the sequential data, a TIFF has a much more flexible structure. At the beginning of each TIFF is a simple eight-byte header that points to the position of the first Image File Directory (IFD) tag, which can be of any length and contain any number of other tags, thus enabling completely customised headers to be produced. The IFD also acts as a road map to where the actual image data is stored in the file, and the tagged nature of the format means that this needn't be stored sequentially. The IFD can also point to another IFD tag, so each TIFF can contain multiple subfiles.

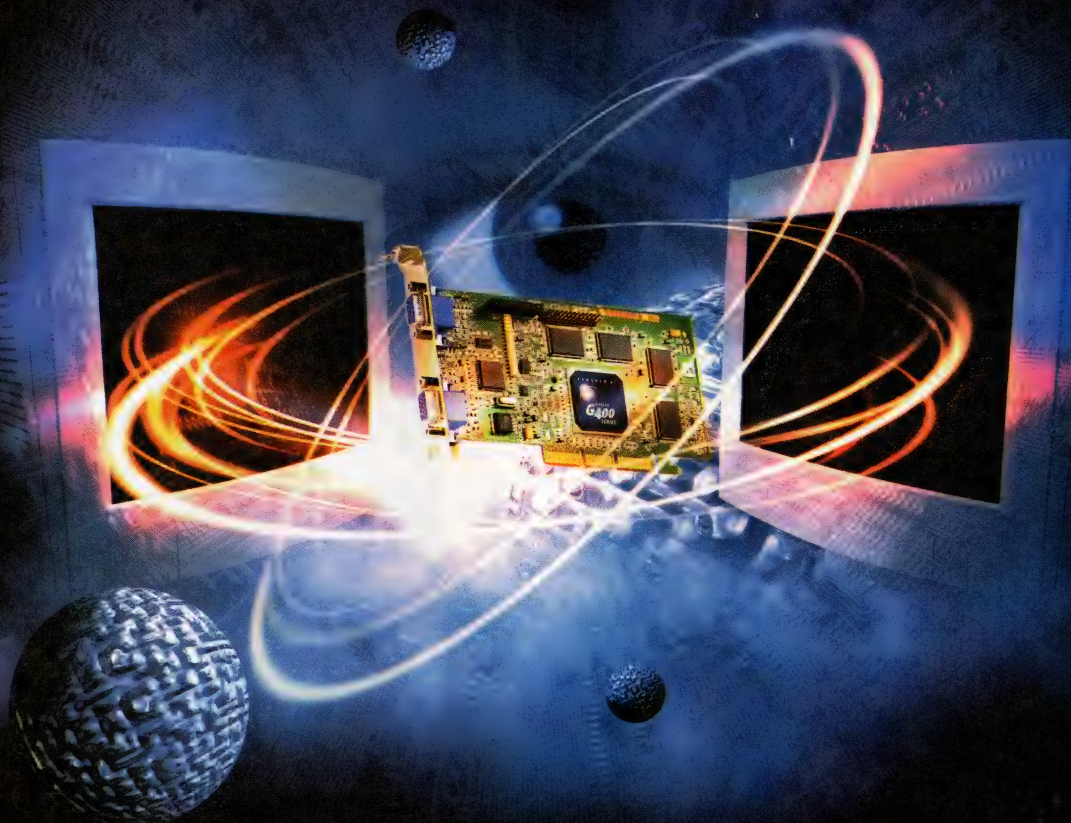
The TIFF's flexible nature brings many benefits. On the structural level, the fact that multiple images can be contained in the one file is useful when it comes to storing alpha channels. More fundamentally, data needn't be stored scan line by scan line, but is broken

GIF

The TIFF's flexible nature has a further drawback, in that its tag-based structure adds a considerable size overhead to each file. For print work that's a price well worth paying, but it's not acceptable for Web work, where every byte counts. The main format that has come to dominate here is the GIF (graphic interchange format), thanks to its combination of palette-



▲ Before saving to GIF, the colours in an image must be restricted to 256 or fewer colours.



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based indexing and LZW compression.

GIFs can contain a maximum of 256 colours using an eight-bit palette, but unlike some other formats it takes full advantage of the ability to store images with fewer colours at lower bit-depths. The fact that GIF restricts the number of colours also makes the typical flat-coloured GIF image more suitable for LZW compression. In fact, the GIF format tweaks the LZW method for greater efficiency. The TIFF format's data packing scheme means that each byte may represent single, multiple or fractional pixel values, making repetitions less likely to occur and so reducing the compression rate. GIF allows its LZW dictionary to be initialised before compression begins with between two and 256 symbols (depending on the chosen bit-depth), the result being that for a typical eight-bit image, a GIF can achieve lossless compression of 40 per cent or more.

Apart from its minimised file size, GIF offers a number of other optimisations for browser-based display. Its use of interlacing means all even scan lines are stored first and then the odd rows are split into three sets. Therefore, the image appears in four passes with a 'Venetian Blind' effect, so a viewer can grasp the essence of the image after only 50 per cent of the data has downloaded. The GIF89a release advanced things by adding control extensions. Flat transparency was added through palette-based indexing, while control over overlaying and disposal method meant the multiple images the GIF87a format could already store could now become a slide show. Suddenly, the static rectangular GIF became an integral and animated part of your Web page.

However it wasn't all good news. In December 1994, CompuServe, the format's original developer, announced it had entered into a licensing agreement with Unisys for the use of the LZW compression/decompression algorithm, and that all users and creators of GIFs must now enter into a licensing agreement with it too, and pay royalties. Panic resulted in the graphics community, as it

seemed that GIF was being removed from the public domain, and gave impetus to the development of a rival standard, PNG (portable network graphics), which at one time looked as if it might topple GIF from its pedestal. Eventually, both Unisys and CompuServe back-pedalled by lowering the fees and making them only applicable to programs released after 1995. With no question of the end user being charged - except when they purchase their originating software - the GIF format has been saved.

Or rather, it's been momentarily saved. The problem is that GIF falls between two stools: on the one hand, its palette-based nature is really only optimal for flat-coloured images, though these would be better handled by a vector format like the forthcoming scalable vector graphic format, SVG (see *RWC, Publishing, issue 25*). On the other hand, for continuous tone photographic images, where a pixel-based format is the only option, GIF's 256-colour limit and LZW compression are unsuitable, resulting in both poor image quality and large files. JPEG was developed in 1987 by the Joint Photographic Experts Group to solve this problem.

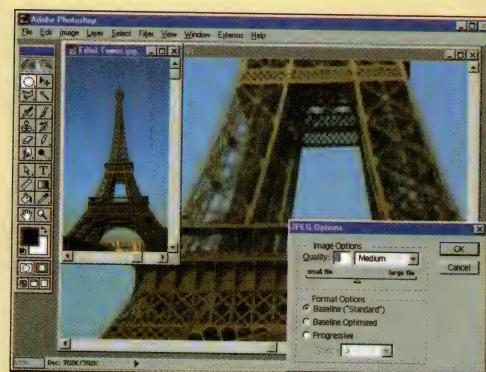
JPEG

What made the JPEG format so different was its acceptance that compression could be 'lossy'; that is, that some information could be thrown away - the trick being to make this loss as imperceptible as possible. The result was a five-stage process.

First, the image is converted into a colour space (LAB again), where colour and luminance are handled separately. The two chrominance channels are then downsampled, because the human eye isn't as sensitive to gradations of colour as to gradations of brightness, allowing the pixel data to be cut by 50 per cent with almost no perceived loss of quality.

Next, the image is broken into 8 x 8 tiles that are transformed through a Discrete Cosine Transformation (DCT) into a mathematical equation representing relevant brightness and colour values. Each block is then quantised according to a user-set 1-100 quality setting and, finally, the resulting co-efficients are losslessly compressed using Huffman compression. This results in compression ratio of up to 25:1, with little perceived quality loss on continuous tone files.

Like TIFF, JPEG offers its own different flavours through the use of extensions, including one that stores many versions of the same image at different resolutions in a hierarchical format, and another that applies an entirely different Predictive



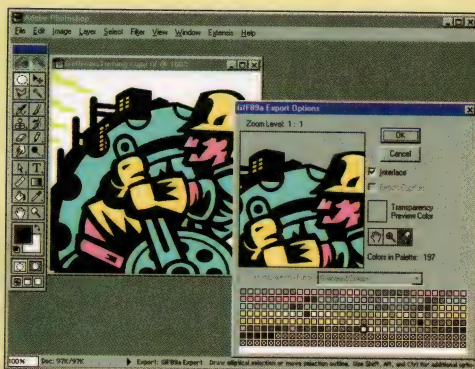
A The JPEG's lossy compression becomes noticeable at high compression settings.

Lossless Coding method in place of DCT.

The most important extension however is the Progressive option, which stores multiple versions of the same file at different quality settings. The lowest quality image is read first, which means that a blurred image will be displayed very quickly, but then appears to come into focus. This can be effective for large images, although unlike interlacing it means it actually takes longer for the final image to appear.

Generally, it's probably wiser to stick with the baseline specification, sometimes referred to as the JPEG File Interchange Format (JFIF). Of course, as a creator you shouldn't stick with JPEG at all - it's easy to forget that every time you save to JPEG you're throwing away more information. So, you should never work directly on an existing JPEG image, but immediately convert it into your editor's own proprietary format. Just as for the other bitmap standards, JPEG's greatest strength, its lossy compression, turns into its greatest limitation and its Achilles heel.

In a way this is inevitable, and you have to recognise that BMP, TIFF, GIF and JPEG are powerful, but only as exchange formats. Each format is so precisely targeted at a particular area - screen display, print, flat-colour Web images and continuous tone Web - that when used outside this area, huge shortcomings are unavoidable. So while it's true that these are the four standards you really need to know about, I'm afraid they aren't the be-all and end-all. If you want your work to rise beyond standard class, you do still need to know about PNG, PCD, PSD and PDF. But that's another story and a future article.



A The GIF89a extensions enable transparency and animation.



Tom Arah

Tom Arah set up his design company in 1987. As well as design work, he now provides training and consultancy.



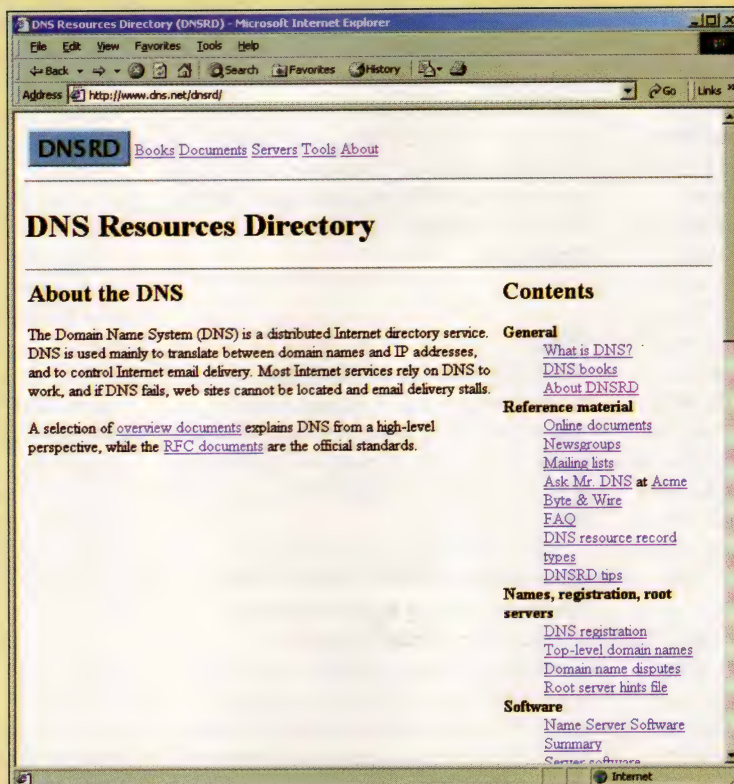
Back to the future


Steve Cassidy spends some time fiddling with his Domain Name Services and falls in love with an old dog.

A couple of columns ago I wrote about the way that four simple parameters - 10Mbps/sec vs 100Mbps/sec, and half vs full-duplex - could keep the most hard-boiled of network administrators awake at night. A few months before that I'd written about the aggravation lying in wait for those unwary enough to start fiddling with DNS (Domain Name Services). I foresaw a rocky road ahead, because those who write DNS systems assume that everyone wants to be entirely visible to the net world.

The latter is a rather difficult subject. Bits of cable are only so hard to understand, as they have two ends, four active strands and two regularly-encountered speeds, whereas DNS is harder to deal with. If you did a book search on cabling at www.amazon.com, a list of Category 5 Ethernet titles wouldn't take up a single sheet of paper, but if you look for DNS reference works, the list fills an impressive eight pages. And that doesn't even include the trademarked ...For Dummies title. In short, a lot of network managers are going to encounter DNS close-up in the near future.

Why is this? Even setting aside the issue I raised - namely, the presumption that you have an FQDN in all DNS documentation and setup reference material - there remains this certainty behind all development of networking in the first few years of the 21st century. Everyone is going TCP/IP. Whether you decide to use a browser, or you buy into intranet



 www.dns.net/dnsrd; see how confusing the Big Science version of DNS can be.

concepts, you're lining yourself up for DNS fun and games.

This stuff is a lot harder work than what I called the cabling 'net-twister'. Did you spot my egregious use of an Extended Three-Letter Abbreviation (ETLA) in that previous paragraph, an FQDN? Sounds like something Americans probably 'deploy' somewhere. And in a sense it is, because FQDN stands for Fully Qualified Domain Name, and it's a bit like what the class swot in physics lessons used to love to write on his exercise book - namely, 'J Swot, Acacia Avenue, Newtown, Sydney, Australia, The World, The Solar System...'

A month or two ago, during my first sit-down with my home network, I discovered that what had previously been a fairly relaxed DNS setup under Windows NT 4 has become a lot more officious in Windows 2000 Server. You encounter terms like FQDN more frequently, and while there are still many things that the DNS Manager will do for you, there are also a lot more bones poking out of the dirt. Mid- 1970s dirt too, for we're all about to roll forward into naming and controlling our network resources using a standard laid down while Russia was still the Soviet Union. Were this same 'longevity equals desirability' criterion applied to net hardware, we'd still be swapping tips for tuning the 300baud acoustic coupler.

By any other name

Okay, so this sounds

confusing. And it is. Very few techies appreciate what DNS might do for them, much less what it's about to stop doing for them if they trundle blindly into Windows 2000. So I'll recap a little:

1 Everything your Web browser does concerns name look-up. If you're ever bored enough to watch those little status bar messages from IE 4 or 5, you'll see that sometimes it tells you that it's connecting to 203.114.xxx, but more often it deals in FQDNs such as support.novell.com. Your workstation has to ask some machine somewhere 'Hey, where's support.novell.com?' and this has to happen before any data can be returned from

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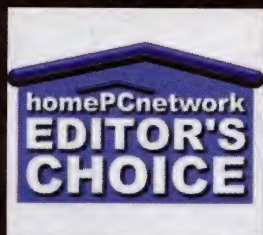
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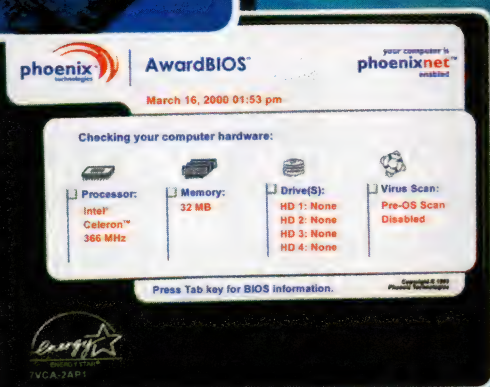
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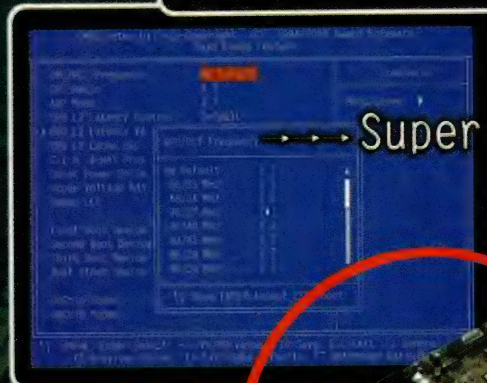


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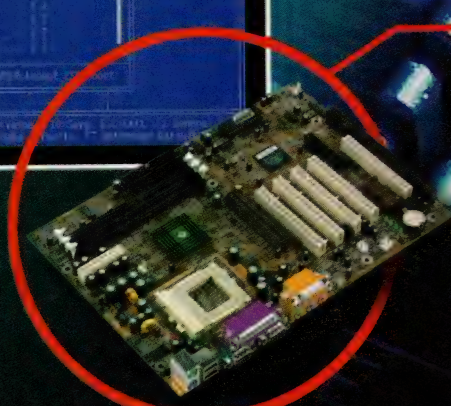


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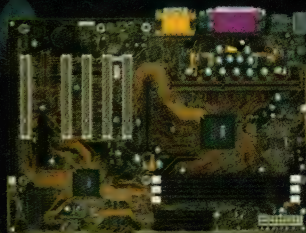


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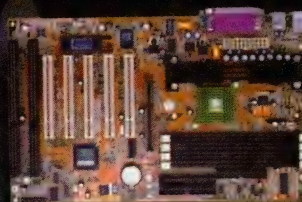
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Old dog, new disks

This all started when I dropped by the local computer shop and saw a Pentium Pro 200 for \$100. I'm a terrible 'old kit' addict, and the Pentium Pro was in many ways the 'Processor That Was Too Good To Live'. NT 4, in particular, is optimised for it in several places, and it was the first Intel CPU to be designed for operating in multiple-CPU configurations.

We have two Pentium Pro 200 servers still running, a matched pair of ALR Evolution Vs each with 8Gb of disk, powered by Adaptec 2940U (not W) SCSI controllers. These old faithfuls flashed across my mind as I stared into that window: how much better would they run, I wondered, equipped with a set of modern disks and controller, and brought up to full dual-processor speed?

I found out, but not the way I'd wanted. Over the Christmas and millennium period we physically unplugged every server, and in that brave new dawn when we turned on the matched pair of ALRs, only one of them came back up. Gilbert was just fine, but Sullivan was sulking. Its disk had given up.

Now those disks dated from even before the PPro200 era. They were huge IBM DFHS full height, 3.5in things, delivering 4Gb not very quickly by anybody's standard these days. Lack of activity from the machine provoked a bit of hard thinking - how were we going to get the best value on a budget constrained only by our desire to be paid a large bonus? The answer was to hustle back to the store and see if I could still find that Pentium Pro for \$100, call ALR (now Gateway) and see if I could get a Voltage Regulator Module for the empty socket on the motherboard.

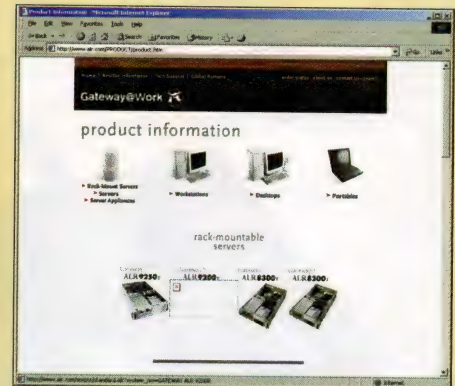
With the right RAM chips (60ns 72-pin ECC), these motherboards run far faster than their apparent rating would suggest, so we spent the money on a CPU, ECC RAM and on a new Adaptec 2940U2W controller with a matched pair of 9Gb Ultra2 SCSI disks, which will shift data in ideal circumstances at 80Mbits/sec. We weren't at all surprised to discover that the newly-built system went like a rocket, nor that NT

4 needed someone to sit, hawk-like, poised to hammer the F6 key to death the moment the first CD-ROM boot message showed (because the Adaptec U2W controller isn't in the default hardware list, and will thus kill setup 20 minutes in unless you patch it into the list right at the outset).

What was strange, though, was that in an idle moment I put the DFHS drive - now relegated to boat-anchor status - back into the machine, hooked it up to the 50-way SCSI cable that came with the U2W controller and - miracle of miracles - it spun up. Most often, the problem with old SCSI disks that give up the ghost in smaller machines is that their terminating resistors have died or wandered off-specification. In this case, it wasn't the resistors on the drive itself, but the ones on the disk controller card: put it on a new controller and back it came.

We didn't chance our luck any further. It was nice to get back onto that drive to do a ten-minute data-copying session, rather than an hour playing hunt-the-backup-and-hope-it-restores. But as soon as that was done, we whipped it straight back out again. Nice, modern, matched components win every time. The new setup of dual Pentium Pro 200s, ALR Super-I/O motherboard with 256Mb of ECC RAM and two disks running as separate volumes is extremely capable. This ALR is about to become my non-stop DNS machine.

Failure modes for SCSI drives are many and varied. I came across another way to extract minimal performance from the maximum amount of hardware the other day, with a reasonably-fast server (Pentium II/450) with 105 per cent RAM utilisation, a single Adaptec SCSI controller card and just one very large system volume mirrored through NT's software mirroring. That 105 per cent figure was the killer, because the system was keeping its swapfile on the mirrored volume. It didn't matter how fast the drives were (and they weren't very), because what mattered most was that whenever the RAM usage ramped up, say,



A www.alr.com; a sub-site of Gateway these days, but with long-term legacy support.

because of a bit of Exchange activity, they had to go crazy, sometimes swapping for several seconds as that swapfile caused the mirror to update - and all down the same SCSI channel.

Those who like mirroring, duplexing and all those other neat tricks should ask themselves why it is that multiple-channel SCSI cards still cost well over a grand. It's because on-board processing power, separate from the CPU, is mandatory to push and pull data up and down those channels simultaneously. With more than one disk using a single channel (remember, most Adaptec's fitted in the last five years have been single-channel), they operate like several workstations on a network, so while one of them is talking all the others must keep quiet. In such a setup, when one half of a mirror pair is talking, the other half must, by definition, become out of date and will need to catch up later. If someone is determined to use software SCSI disk mirroring in a server, as an absolute minimum I always advise using more than one SCSI card. When the disks in the mirror set are attached to separate cards, the data arrives at each in the very same instant (measured at disk data transfer speeds, at least). This is the right way to do it. That single Pentium Pro 450 server was slower than my Pentium Pro 200 old dog, which just goes to show not every new trick is worth learning.

that location.

2 If you're going to use an internal system to produce your own intranet - and this is a concept whose hype has died down to a point where I'd consider it worth exploring (cautiously) - then all the participants in delivering data over that intranet will have to

be referenced by a name resolution system for use by TCP/IP.

3 DNS is enormously efficient. It's been around as long as flared trousers (the first time round) so making a DNS server work at an unholy speed is a well-understood business.

4 Given all these reasons, Microsoft has decided that when an NT machine goes looking for a network name, it will do so first of all via DNS. You can hack the ordering of name resolution - and real veterans of this column will have those Registry keys at their fingertips - but I'll confess I gave up that

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Beware of geeks bearing gifts

I broke my homebrew workstation over Christmas. It's based on an AMD K6-III/400 processor in a rare Tyan S1590S motherboard, deliberately built to be very odd and test my suspicion that oddness and compatibility are often strangers. It turns out I was right, for while looking at the Novell DNS server management console add-on, I managed to completely freeze the Novell application when I needed it to work. The circumstances are fascinating, so stick with me while I engage in some serious software vertigo. The sequence of symptoms was:

- ① Log in to Novell network.
- ② Start America Online and go and pick up my mail and my partner's, using AOL's capability to 'tunnel' out through another service provider.
- ③ Have a minor crash in AOL, which Windows flags, closes the client and then try to open the Novell DNS console. No go.

The key to all this was Java. This isn't merely a figment of programmers' CVs, but a living, breathing part of your Windows 95, 98, NT, 2000 system (and every other type of system too). All the later Web browsers come with Java in or around them. Novell knows this and in keeping with the intranet religion has been coding several of its administrator's add-ins to use Java. What was happening was that the AOL front end was using Java in those little pop-up adverts embedded in several of their on-screen dialogs (most notably the mail inbox display). Make an unusual Java call, and bang goes the JVM on the workstation, leaving the machine running but all other Java applications out

of order pending a reboot.

I was reasonably sure that this was an AMD processor problem, because running AOL on the Dell 410 at the other end of my desk with Windows 2000 Workstation didn't produce the same behaviour. So, after a lot of horse-trading, these words are being written on a SuperMicro SB6 motherboard, fitted with a Pentium II/400, 128Mb of RAM and the same Voodoo3 3500 TV display card. Hey presto! No more Java crashes, and some strange behaviour by the Voodoo card in synchronising to composite-video signals has gone away too.

The homebrew is already on its second ground-up rebuild, thanks to a local ISP. I rebuilt the setup in a hurry, and couldn't find a copy of Internet Explorer 5. So the next day, I picked up a cover-mount CD that had IE 5.5 buried in a folder as part of an ISP connection install system.

Now with previous versions of IE this easy-going approach has worked just fine for me, because my network does my ISP connections, and not my individual PC. No machine has Dial-Up Networking enabled, and whenever the Connection Wizard starts up I just tell it I'm on a LAN and it goes away. Not with this install of IE 5.5, however. I soon found myself facing a full-screen introduction, overlaid with a dialog asking me whether Windows should detect my modem or let me pick it from a list. I don't know which is more worrying, the fact that my system had no modem, or that Windows thought it did.

That full-screen window was a browser process: my IE 5.5 install had worked, but was 'modified' as part of the ISP's

distribution to set up a DUN connection - and tough if you didn't want such a thing. I was unable to stop that full-screen Wizard from popping up, with no facility to take its Dial-Up Networking entry out of the Network Control Panel, and not even the prospect of getting a clean uninstall from the Control Panel - even once I worked out how to kill off the full-screen setup and get back to my Desktop.

These things happen because Microsoft has long encouraged resellers to put their own logo and 'improvements' on products, and this particular ISP has done just that. And if you have an empty new PC and a modem, I'm sure this method of setup is marvellous. However, it's certain death for a machine connecting through some other ISP, or linked up to an ISDN or leased-line router for Internet connectivity. IE 5's openness to such customisations, and the way that the browser becomes such an intimate part of the operating system in Windows 98, meant I was faced with starting from scratch.

I never thought I'd admit that the AOL front end is relatively friendly to LAN-based Internet connections - what with the ominous presence of that AOL Dialup Connector line in the Network Control Panel - but compared to some other efforts, it's positively cuddly. Java crashes and all. Even if it does stop and ask for the NetWare Client CD partway through installation, and then complains bitterly when you take its own CD out to satisfy the request...

Moral: Do NOT install any browser whose history you don't know.

stratagem a while ago. Better to make DNS work right than to slide round it.

To understand why you need an internal DNS at all, consider this: any DNS anywhere can talk to other DNSes to retrieve the address of a resource not known to it already. If the address is already local, however, an internal DNS can send it back to your local users at LAN speed rather than external connection speed. My experience is that creating an internal DNS for a network of ten people reduces ISP traffic to a point where you can stay with that 64Kbits/sec connection long after other, equally busy but DNS-less, networks have had to upgrade to 128Kbits/sec.

To understand why all those DNS books are so thick and so impenetrable, consider

this: once you're the authoritative server for a zone, any other DNS user in the world (all 200 million of them) could at any time ask your system questions.

Just about everyone who reads my column - as distinct from Paul and Mark's Web Business column - will not be running a globally-visible, authoritative DNS server. Avoiding having to do that is the main way to save money at present, although it's hardly surprising that ISPs, intranet and VPN gurus (indeed, the computer sales business as a whole) all want you to stump up for the entire kit of parts. I don't see it as necessary, and neither did the designers of TCP/IP, way back before Hot Hatches, Gulf Wars, spreadsheets (or indeed Web browsers). That's why, even back then, the founding fathers set aside the

private network number ranges, 10.0.0.1 and 192.168.0.1 and all the others. These are our friends, because they allow us to forget about FQDNs, SOA or MX, and to just stick a nippy little internal DNS on our slowest, but most reliable machine. Or at least they did under NT 4 and NetWare. Windows 2000 - now that's another matter...



Steve Cassidy

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Drawing the Linux

David Moss plays Borland's game of musical names, while **Jon Honeyball** migrates from an NT 4 domain model to Windows 2000.

Alas, poor Borland, I knew it well - it's always a shame when a nice company like Borland vanishes. I've no insider knowledge of Borland, so I speak from the point of view of someone who has watched the company for a long time. I always got the impression that people at Borland enjoyed their work, and certainly they came out with some great products over the years, not least programs like Quattro Pro and Sprint.

I always felt that Sprint not appearing as a Windows word processor was a damn shame, and to me it felt as though Borland had really missed the boat there and never quite got back on track again, despite some innovative, well-

presented software, not least Borland Turbo Pascal for Windows, the precursor to Delphi. Sidekick was another product that had many fans, for example.

Sprint apart, I'm not sure how Borland lost its way. Some say it was the building of a massive office complex, but I felt that people began to wonder how committed the firm was to its products, because it went through a long period of bringing out and then discarding products at an alarming rate. I really liked ObjectVision, but that seemed to just vanish without trace. Then Turbo Prolog came and went in much haste too, it seemed, and there were some utility programs that seemed to pass in the twinkling of an eye. The less said about Borland Office the better, probably.

The changing of the company name to Inprise seemed totally bizarre to me, as I could never think of it as anything other than Borland, nor I suspect could many others.



A Corel LINUX displaying the contents of all four desktops, plus a cute penguin - ahhhhh!

Then it became Inprise/Borland, which I'm sure left people confused as to what was going on. When the press release arrived announcing the fact that Borland - sorry, Inprise - had merged with Corel, I felt a great sadness when I saw that the new company name would be Corel. No more Borland.

I mentioned the merger to a colleague a few minutes after reading the press release, and he rather cruelly said, 'Ah yes, drowning people often cling onto each other, don't they?' Corel drowning? It has certainly changed somewhat from the company that brought out the wonderful CorelDraw (a program that did more than its fair share in promoting the spread of Windows as an OS, in an oblique sort of way). A few versions down the line though, I started to get the distinct feeling that the marketing folk were suddenly driving the ship, and appeared to be introducing what one friend called, 'features for features sake'.

There then followed a period of acquisitions, so that now Corel is a very different beast from the one that first appeared, its clever group of developers with their happy faces smiling at you from line drawings in the manual, as I recall.

The purpose of this merger appears to be to secure a hold on the Linux market, and it will be extremely interesting to see how well the merged entity will do in trying to persuade the business world to switch from its established Unix/Windows setups for both servers and workstations. Java was supposed to be the 'Big Thing' for a while, but I started to notice that many

Linux people I spoke to were openly critical of Java, which didn't make a lot of sense. I think this criticism was more aimed at Sun and the way it handled the whole Java issue, plus the fact that none of the Linux people I spoke to liked the fact that it was probably only due to Microsoft shipping so many Java run-times with Internet Explorer that Java gained the penetration it has so far.

It will be interesting to see how Corel measures up against Red Hat, which will now surely be its main competitor (Red Hat now has serious financial backing and is unlikely to roll over and play dead). Borland had a version of Delphi for Linux, codenamed Kylix, in the works, and I'm sure that was the main attraction of this merger. Corel certainly has a Linux desktop productivity suite that has received many plaudits for its ease of installation, but to make this work commercially it's going to need serious server



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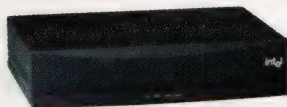
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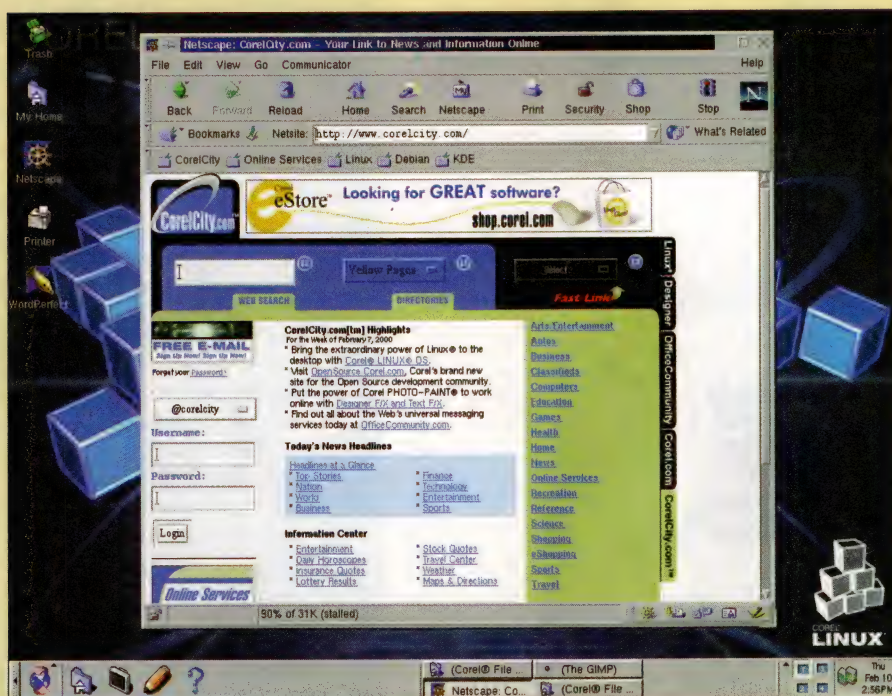
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Netscape running under Corel LINUX. Netscape continues in its quest to challenge Internet Explorer.

software that has to be easier to use than Windows or the established Unix variants already in place. Applications are key to the success of an OS (and I don't just mean established applications being ported across), and the key to getting new applications is a good development environment. One of the frustrating things about Linux at the moment is that development is heavily dependent on C++, without any equivalent to Visual Basic that might bring in all the new developers to start knocking applications out by the dozen. Kylix could be the key to changing all that.

No more nerds

The Linux scene is all rather nerdy at the moment: I know plenty of Windows users who've dabbled with Linux and then gone quickly back to the land of the fluffy white clouds. At least when you get a Windows program down from the Web to try it out, you don't usually get asked to compile the damn thing before attempting to install it. All that is set to change, however, and this merger will speed up the process enormously.

Corel not only has a version of the Linux OS to supply, but an application suite to go with it, specifically WordPerfect Office 2000 for Linux, which will ship shortly with the OS. The suite contains WordPerfect, Quattro Pro, Corel Presentations, and CorelCentral (a PIM, for those not familiar with this suite), and all of these applications will be compatible with the Windows versions. A Deluxe version of the suite will ship later, which - according to the press release - will add Paradox, enhanced

technical support, an entertainment pack and a Linux Penguin bean-filled toy.

The fact that Quattro Pro is part of the suite, and that Paradox can be found within the Professional version under Windows, means that Borland and Corel were hardly strangers to each other. It's my guess that this move has been coming for some time, and that Inprise/Borland's recent announcements about InterBase, Application Server, JBuilder, VisiBroker and Kylix entering the Linux world were all part of making this merger look like a good one for both companies.

It will be very interested to see how well they succeed in pushing the OS and its applications forward, and I think they represent a significant threat to Red Hat's current dominant position. The real test will, however, come when they see how many businesses decide that moving to a Linux and Corel application suite represents 'a good idea'. Forget about all this 'free' nonsense: if you want the full version of CorelLinux OS, you'll have to pay for it.

Against that, you have to balance the fact that this application suite hasn't made that many inroads into the Microsoft Office customer base so far, apart from getting the US Department of Justice contract, and I don't expect to see the suite alone, even when accompanied by a reasonably easy-to-install OS, to be suddenly able to threaten Microsoft's position. Red Hat is another matter entirely, and it must be looking at this announcement with some concern.

Nevertheless, the merger substantially increases what threat there is to Microsoft, and

we may now see a serious battle for the hearts and minds of desktop users start to develop at last. As to predicting the winner, well, Netscape failed to stop the inexorable rise of Internet Explorer because the Microsoft product was and still is a better product, and that's the key. Linux and its applications deserve to succeed or fail based on how good they are, and not on whether they ship with a bean-filled penguin rather than a purple dinosaur. I now have Corel LINUX installed (as well as Caldera's OpenLinux eServer), and I'll be reporting back about how I get on with them both in the months to come.

David Moss

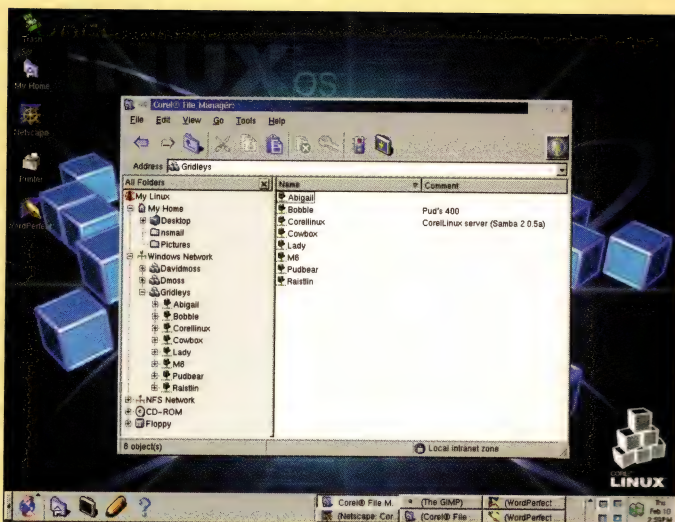
Pity the poor migrant

Migrating from an NT 4 domain model to a fully-populated Active Directory Windows 2000-based model isn't going to be a task for the faint-hearted. At a recent training course, we were given the task of taking a hypothetical large corporation, which had main offices on all continents, about 40 country offices, and around 200 regional offices, through the procedure. Connectivity wasn't fast, but generally consistent between the sites. The 'firm' ran a large multi-domain trust model in NT 4 where only some of the domains trusted other domains, and there was the usual collection of small satellite sites that demanded autonomy.

This is a company with more than 100,000 employees, hence there'd be a lot of scope for reducing software costs, maintenance and installation overheads too. There was an Exchange Server 5.5 implementation in place across the whole company, and its directory was fairly well populated. Finally, the primary company DNS was running on Unix computers, using an old version of BIND. The desktop computers were a mix of NT 4 desktops, laptops running Windows 98 and some older machines running Windows 95. Given all this information, how would you design a migration plan to get Active Directory up and running and to lower the total cost of ownership of the entire IT infrastructure?

I should point out that there were some 12 participants on this course, and we were split into two groups of six. We had from 10am to 4pm to work out our design and migration plan, and come up with a logical Active Directory structure design that would work. Oh, and it had to support the current NT 4 domain infrastructure at the same time. Does it sound like the sort of challenge you'd relish on a cold Friday morning? Good, let's dive in and see what we decided to do.

First, it was quite clear that we had to start by looking at the DNS infrastructure, and that we wouldn't be able to persuade the firm's IT people to allow us to rip out the existing



A A view of the Windows network from CoreL LINUX.

corporate DNS servers - the existing Unix-based BIND services would have to stay in place. Since the version used by our hypothetical company could not accept all the Windows 2000-supported features, like dynamic DNS and SRV records, we decided it would be a good idea to create a complete child domain hanging off the old Unix DNS servers, so that we could run the DNS for that on our new Windows 2000 servers. The first move, therefore, was to allocate a child domain to internal.corp.com, with this 'internal' namespace being used for all our Windows 2000 servers on the internal network.

The next obvious question was how we'd divide up our Windows 2000 namespace to support the needs of our users and the business functions. There are two ways we could have progressed here; first by creating more child domains, like europe.internal.corp.com and namerica.internal.corp.com. However, there's no real need to do this under Windows 2000, and it has the downside that your names can get a bit long. This multiple child domain model is the one the other team chose and I have to say it does stand up well as a model. However, we decided to be daring and to drop everyone into one domain model, which meant everyone was in internal.corp.com.

We then decided to use Organisational Units (OUs) to help separate out the logical structure of the company, so we put in place top-level OUs covering the major geographical areas, then set up child OUs for countries and child/child OUs for each regional office. This allowed us to set up the sort of policy we wanted, and it could all be set from anywhere in the forest.

The question then arose about what to do with the hardware. Obviously, those machines running NT 4 Workstation could be upgraded to Windows 2000 Professional, and the machines running Windows 98 could generally

which allowed us to use the encrypted file system and to make fuller use of off-line folders. Why did we want to push everyone onto Windows 2000 Desktops? Well, it would enable us to keep much firmer control of the applications deployment and management features available in Windows 2000, and use them to publish or force-install applications onto user's Desktops. Plus, it gave us stronger control of the Desktop and Start menu itself.

The next question was how we'd populate the Active Directory itself, and the easy and sensible solution was to wire up the directory in Exchange Server 5.5 to the Active Directory system using the supplied connector, then do a bulk transfer followed by synchronisation of the Exchange Server directory into Active Directory.

To control inter-site traffic we defined Sites in Active Directory, which enabled us to partition the data flow sensibly by informing Active Directory where the physical boundaries were on our network. When it came to the final fit and finish, we had to remember to move the Exchange Server 5.5 LDAP service off its default port, and to ensure we had plenty of Global Catalogue server services in place to manage the Active Directory replication and login requests.

Finally, we decided it would be a good idea to modify the default document templates in Word to allow for direct look-up into Active Directory via Active Directory Services Interface (ADSI) calls, which would enable us to push the directory right out to the desktops of all the users.

In terms of the training skills required, we decided that the people running the top level of the Active Directory structure needed much more training and knowledge than they had at present, especially in terms of Active Directory schema designs, Windows 2000 replication and so forth. The administrator role at the site and city office level should be simplified into a true

run Windows 2000 Professional if they were given a small memory upgrade. However, the Windows 95 machines were judged to be so weak that they'd be better turned into Terminal Server clients, connecting to Terminal Server sessions on the Windows 2000 servers. Oh, and the laptops would be pushed up to Windows 2000 Professional too,

local administrator role, working on the delegated security for that site only, and the use of MMC 'taskpads' was felt to be an ideal way to push straightforward administration tasks down to the individual local technical support person.

For myself, I decided to be a little bit radical and to call in some third-party software to help with the migration, because I wasn't convinced it was going to be terribly easy to do the NT 4 to Active Directory migration while keeping everything in sync. I've no problem with the idea of doing this for a medium-sized network, but given the costs involved in this project and the numbers of seats it would affect, I decided we could afford to be a little more lavish on the toys budget (Sorry, that should read tools budget.) Hence, I recommended we look at the NT 4/Active Directory/Exchange Server migration toolkit from Mission Critical Software.

I haven't used this in anger myself, but I've heard very good reports about it from people who are using it for real. I saw a strong presentation on the technologies it uses a few weeks ago, and was impressed by the depth and capability of the toolset. For more information on this, check out www.missioncritical.com and order up the trialware version of its software. Before you go any further though, I recommend getting expertise in using such a tool: adding more complication to your migration and data integration plans wouldn't be wise if the fundamentals are a little shaky.

By this point we felt we'd earned our fee from our dummy global corporation, and we were most disappointed to realise that it was still only a simulation and a training exercise. However, it was a great opportunity to kick around design and development ideas as a team, and to do real problem-solving on these sorts of technical designs.

Jon Honeyball



David Moss

Software developer, consultant, Web designer and freelance computer journalist specialising in Visual Basic and Windows.



Jon Honeyball

Computer journalist and consultant specialising in both client/server and office automation applications.



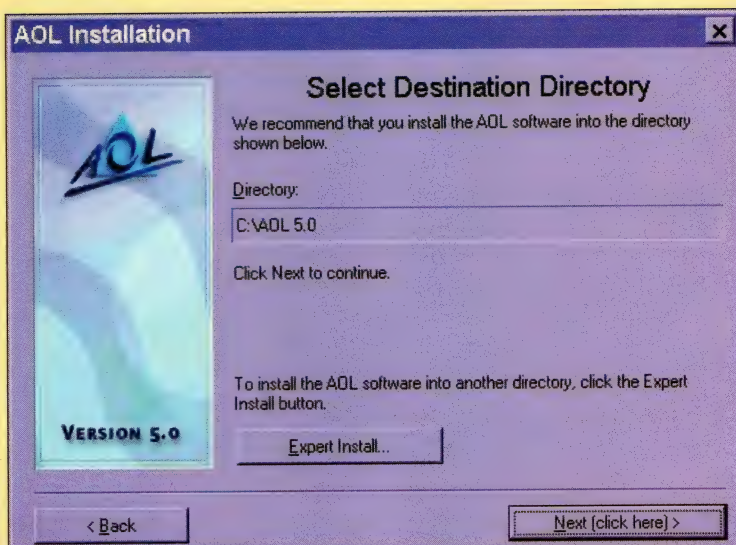
Unfriendly install

Davey Winder is reminded of the bad old days as he discovers that the latest bit of software won't necessarily be the best.

There can be no denying that AOL enjoys, shall we say, a 'mixed' reputation among Internet users. On the one hand, it provides newcomers to the net with an easy 'on ramp', a gentle hand-holding introduction to the online world; on the other hand, it has a reputation for being home to the Internet newbie from hell. Undoubtedly, a lot of the hatred stems from unashamed Internet snobbery, that same knee-jerk exclusivity that lies behind the 'not in my playground' attitude displayed by so many Usenet old-timers.

But AOL remains the biggest ISP on the planet, by quite a margin, and an influential Internet player whose influence is bolstered by the recent merger with Time Warner. I'll admit to having an AOL account myself, and it's not just some journalistic freebie either. I actually consider it worth a few dollars a month to have access to some of the proprietary content on offer, plus it provides a decent enough fall-back ISP should I need one for whatever reason while out on the road.

It's for these reasons that many people will be tempted to give AOL a try too. The installation CDs are given away everywhere, and there's a free trial offer, so it need not cost anything to try. In the past I've often used these same trial offer CDs as a source of software upgrades for my clients as well, and it's always been a simple case of firing up the setup routine and picking the 'I'm already an AOL member' option. Going the CD route saves you a multimeg download, and it has proved pretty trouble-free as far as the last few revisions have been concerned. Then came AOL 5,



A If it ain't broke, don't break it - a good mantra for those thinking of upgrading to AOL 5.

dubbed the 'Upgrade of Death' by the more vocal and less forgiving of Internet users.

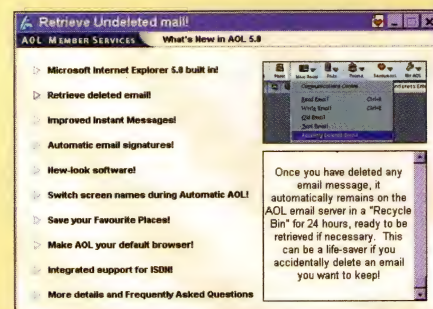
Like many IT professionals I'm quick to preach 'if it ain't broke don't fix it' but am slow as hell to practise it. You can usually rely on Wavey to install the latest software patch or hardware upgrade just as soon as he can get his grubby little hands on it. Yet even I have not dared to venture into the dangerous territory of upgrading any of the mission-critical machines in my office to AOL 5.

The AOL 4 client software works perfectly well and is totally trouble-free, so I'm not minded to mess with it on my work PCs, and plugging into the Internet grapevine suggests that I'm not being over-cautious here. The new version 5 client software takes several steps forward, offering features such as the ability to retrieve deleted emails (within a 24-hour time frame), a working email auto-signature function at last (welcome to the modern-world AOL) and integrated support for ISDN.

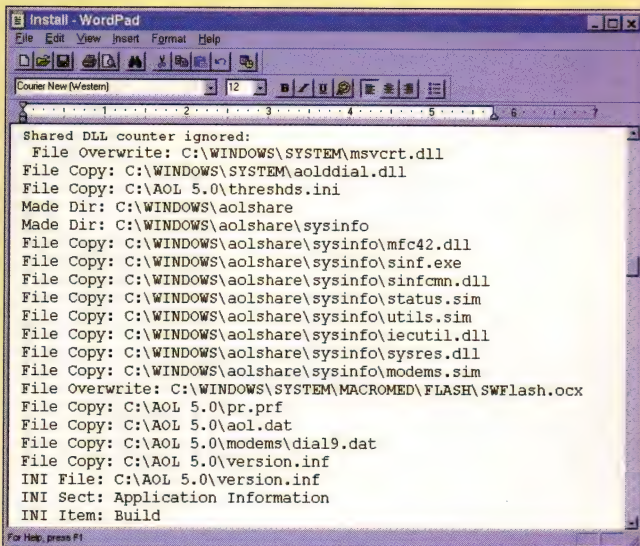
Unfortunately, it manages to counter these steps forward with a good few paces backwards, courtesy of its unfriendly installation, as I'll gladly explain.

Installing AOL 5 reminds me of the bad old days a few years hence, when users were only allowed to have one ISP connection on their computers. If you wanted to install more than one and fancied trying out CompuServe or AOL, you did so at your own risk, often discovering that the new online service took over your PC and prevented you from (easily) dialling up any other ISP. That was good news for us journo's, of course, because it gave us plenty to fill the column inches

with, as solutions to the problem. Eventually, it dawned upon the powers-that-be that such behaviour was not very user friendly, and gradually the practice was weeded out (even Freeserve discovered such practices were not acceptable and changed its tack). However, with version 5 of its client software, AOL seems



A Performing the 'Upgrade of Death' offers minimal additional functionality over and above AOL 4.



A The install logfile after a successful setup - see this runaway routine.

to have decided it can go back to those bad old days, trampling all over existing settings, overwriting system files, setting itself up as your default connection without asking, and worse.

Taking my online life in my hands, I thought it my duty to you, dear reader, to try an AOL 5 install myself (on a very non-essential

notebook PC, I hasten to add, that was sitting quietly in a corner of the office doing not much at all. I'm not as stupid as I look, honest). This machine is often used for beta software testing, and I always give it a clean OS install after such testing to ensure that it's stable and ready for the next ordeal.

Windows 98 and IE 5 are installed on it, and I have a dial-up connection to another ISP setup as well. So in went the AOL 5 CD and I held my breath. Aha, that's handy thought I - an Expert Install option

right at the start where it should be. That happy thought soon passed though, because a click on this option revealed that my 'expertise' was confined to choosing an alternative to the default installation directory. Also be warned that when you click on the Next button the installation begins without any further warning, with no more options or time to think - just straight into overwriting your system files and plumping up your Registry.

All seemed to go well, and a couple of minutes later I was rebooting back into Windows with a shiny new AOL 5 system up and running. Which is where the problems started. I had no trouble connecting to AOL, which worked a treat as you'd expect. Then it was time to test my default Internet dial-up connection: I double-clicked my Desktop shortcut and connected okay. A feeling of relief swept over me, only to be swept away rather quickly when a box popped up asking if I'd like to start AOL now that I was connected to the Internet.

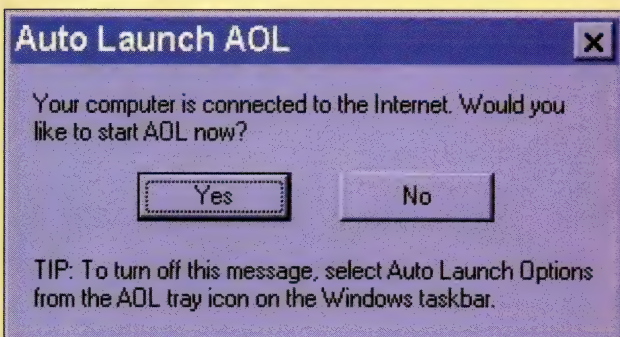
Okay, this did give me a yes/no choice, and there was a Tip dialog informing me I could disable the message by selecting the Auto Launch options from the AOL Tray icon. But I have two problems with

this: first, I didn't ask for any Auto Launch feature to be installed, thank you very much, nor an AOL Tray icon to be activated, but I was given no choice in the matter at any time during the AOL 5 setup.

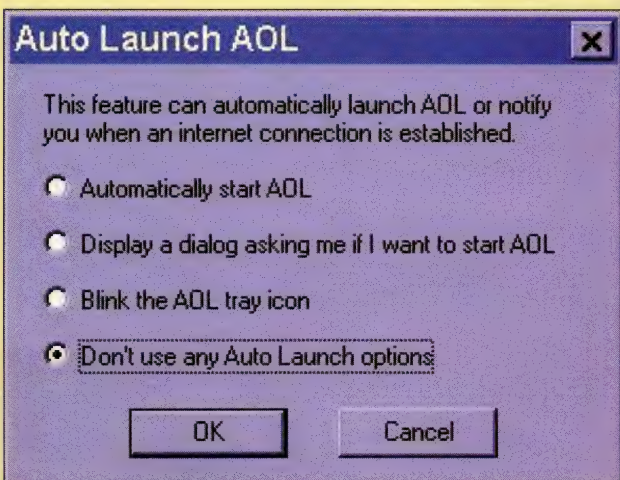
I soon turned this feature off by following the advice to go into the Auto Launch Options menu. So it was easy enough to cure, but annoying as hell that it was done without asking. Next I disconnected from my ISP and fired up IE 5, typed in a URL and hit Return. Which is where I got nasty shock number two, because instead of dialling my chosen default ISP connection I saw AOL 5 fire up before my eyes, quickly followed by another dialog box asking if I wanted AOL to be my default Internet service. To be fair, it did warn me that if I said yes then any other Internet service connections could be affected, but that was a bit late seeing as AOL had already decided to become my default connection: a quick look in the IE Internet Options | Connections Options confirmed this. As if by magic, my current default connection had become 'AOL Dial-On-Demand' and there at the top of my dial-up settings box was AOL, complete with a tool tip saying 'AOL Dial-On-Demand feature - Please do NOT delete this'. Naturally I obeyed the mighty AOL, leaving it where it was and reverting to my own ISP as default connection once more. Again, it was not too difficult to work around, but unfriendly and unforgivable that AOL hijacked my system like this without giving me any say in the matter.

So now I've got a working AOL 5 setup on my non-essential and previously non-AOL running notebook. It wasn't as painful as I'd imagined from listening to the many complaints about the software, but it was nowhere near as painless as it should be from such a big player in the Internet business. One thing's for sure, I'm not going to be upgrading from version 4 on my workhorse PCs, and I'd suggest you think hard about it as well. The installation routine is aggressive, overwriting existing system files without warning or option (my vbscript.dll was replaced with an older version for example, while mapi32.dll seemed to more than double in size as a result of the installation).

What a pile of pants - I hate it when software does the dirty like this. I don't want multiple versions of the same system files, as it's asking for trouble of the unstable system variety. Check the install logfile in the AOL directory after installation and you'll have great fun spotting odd changes, like the entries to the Registry concerning power management keys, for example. Take the utmost care with this 'upgrade' and I'd go so far as to say you should wait until AOL 6 is released sometime later this year and see if it fixes the problems.



A AOL will try to launch itself as soon as it can, whether you like it or not.



A A quick fiddle with the Auto Launch options will see the cheeky monkey off.

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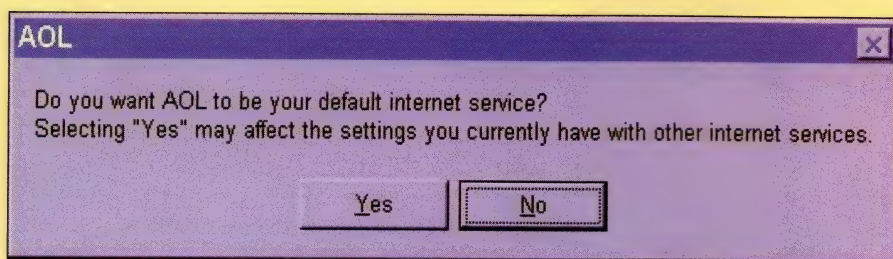


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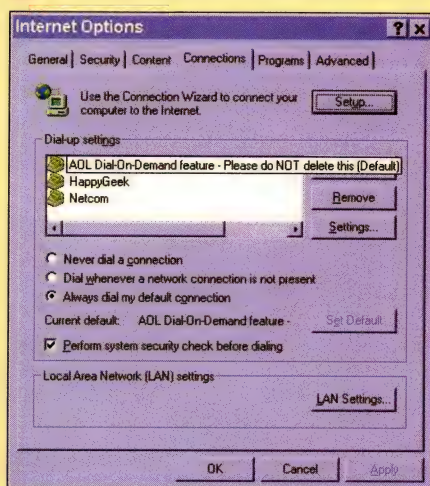
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A Nice and polite, but a hollow sentiment methinks.



A As the dial-up settings box in IE 5 would seem to confirm.

128-bit encryption for IE 5?

No, your eyes aren't deceiving you, that is a 128-bit encrypting copy of Internet Explorer in the screen shot. But alas no, Microsoft is not making it available outside of the US and Canada, and despite some easing of export restrictions on encryption, there seems little chance of the US government allowing it to do so in the near future. Many moons ago I discovered the service at www.fortify.net that could upgrade Netscape Navigator to the magic 128 number, and a little later about the Opera browser which, being Norwegian in origin, isn't restrained by US export restrictions and has fully legal 128-bit encryption out of the box. But what about similar security upgrades for Internet Explorer? Needless to say, by applying a little sideways logic a solution soon became apparent.

Microsoft has made an upgrade patch available at www.microsoft.com/windows/ie/download/128bit, but downloading it is a three-step process involving agreeing to the export notice terms, selecting a browser upgrade option and then passing the US or Canadian ISP connection test that the Microsoft servers automatically apply by using a simple WHOIS check on your IP address. Attempting to download the upgrade from a non US-based ISP simply results in an error to the effect of 'whoops, you seem to be outside the US and Canada,

you can't be trusted with big boys toys'. Instead, you're told to make do with the standard 40-bit version with its Server Gated Cryptography technology that allows 128-bit transactions with approved financial institutions only.

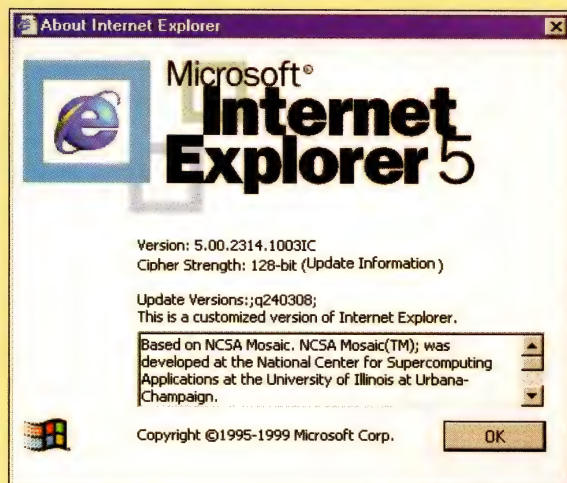
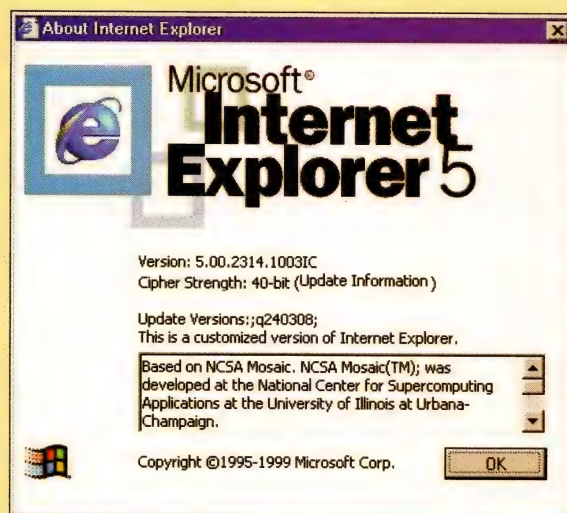
However, the adage that the Internet interprets censorship as damage and routes around it applies, and so anyone with a mind to it can easily route around the Microsoft site restrictions and connect by way of an anonymous browsing service such as IDzap (www.idzap.com). Spend less than a minute registering for the free browsing service, a process that involves nothing more than choosing a username and revealing your email address, collect the emailed registration key and follow the link back to establish an IDzap password, and the determined encryption seeker is halfway there. Another few seconds spent configuring the service to enable JavaScript is all that's required. Now, by using the IDzap browser bar to connect to the Microsoft update site, the fact that you're outside of the US and Canada is disguised, and the Microsoft server will happily allow you to download and install the upgrade patch. At some point in the future the powers-that-be will eventually realise that the Internet is a truly global medium, populated by a global population, who share global information.

Of course, I must point out that neither myself nor *PC Authority* would want to encourage readers to actually try this for themselves, and the foregoing is published here merely to illustrate the stupidity of the export ban, given that the Internet allows it to be circumvented with such apparent ease. So please, don't try this at home or you'll be forever branded a naughty scamp, okay.

A brief history of Internet time

On the first day of the new millennium the British Prime Minister announced government support for the creation of an Internet time standard, based on Greenwich Mean Time (GMT) and called Greenwich Electronic Time (GET). The UK PM was rather late getting aboard this Internet time bandwagon - after all, haven't we already got such a time standard in Universal Co-ordinated Time (known as UTC just to confuse matters)? So before I look at the new proposals in detail, it may be worthwhile looking back at what we already have. GMT originated as the standard for setting clocks on ships before they set sail on lengthy journeys, and thanks largely to the colonial British influence it became accepted as the world's standard time. In Britain, GMT was officially adopted as the national time standard by Parliament in August 1880, and replaced the 300 or so US local times in November 1883. The International Date Line was drawn, along with 24 time zones, in November 1884.

So what went wrong with GMT? The answer is nothing, it's simply that something a little more up to date and technically superior came



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making the most of time

Our mission is to harmonise the exchange of goods and ideas between the world's peoples by promoting the universal time standard for the digital age.

A With time standards popping up everywhere, it's time to GET confused, it seems.



@d01/02/00 @743

A If you thought GET sounded confusing, take a look at Swatch Internet Time.

along to replace it. GMT is mean solar time, with midday defined as the time at which the sun crosses the Greenwich Meridian, the line of 0 longitude. The Greenwich Observatory through which this line passes derives GMT from astronomical events, including the solar day. But because the Earth's orbit is elliptical, the sun doesn't move against the stars at a constant speed, so a hypothetical mean sun is used, which is imagined to travel at a constant speed equal to the average speed of the real sun. This allows a second to be defined as 1/86400 of a mean solar day.

The UTC second was defined in 1967 as being the duration of 9,192,631,770 periods of the radiation corresponding to an electron transition between two hyperfine levels of the ground state of the caesium-133 atom. Quite apart from sounding so much more the business, this is also more constant, being based on the natural vibrations of atoms (or the quantum resonance of a caesium atom if you want to be specific), rather than the rotation of a big wobbly planet. Atomic clocks using this principle can be made accurate to an astonishing single second over a period of 1.7 million years. Little wonder then that UTC replaced GMT as the world's time standard in 1986. All time zones around the world are calculated relative to UTC, itself calculated from the combined (hence the 'co-ordinated') estimates of several institutions running atomic clocks. Not that GMT has vanished, as it is still the 'baseline' from which UTC evolves, and is at the heart of this new GET standard as well.

Having read through the jargon-heavy and

meaningful- explanation-free official Greenwich Electronic Time Web site (www.get-time.org), I'm none the wiser as to why GET is needed. The argument appears to be that the existing use of UTC-based timestamps for email messages and transactions isn't up to the job for e-commerce. The Interactive Media in Retail Group (IMRG) is behind the GET initiative to provide a 'holistic' online focal point for time-based resources, and to develop time tools for the online age. It seems to be driven by the Swatch 'beat' model (more of that in a moment), and although the Web site doesn't mention this by name, it does talk of a 'single company marketing-driven positioning on time who sought to establish a brand-based time baseline for e-time'. Phew, I told you it was full of marketing speak.

GET would, so far as I can penetrate this stuff, be parallel to the existing GMT/UTC standard, but rebrand it under this new 'e-time' banner. We are told that simple tools will track and map e-time and eliminate days as a measure of service commitment, instead measuring service against GET in hours. The example quoted is 'Thank you for your order. It will be dispatched at X-hour GET (XX.YY Supplier Local Time) and is scheduled to be with you at (ZZ.WW Consumer Local time) GET + Y hours.' The premise is that by removing the need for the consumer to calculate the time differences, you bring a better quality of service to the e-commerce chain. Once the whole thing is up and running, the actual time standard itself will be delivered from atomic clocks (3 Stratum 1 atomic clocks in London's Telehouse, managed by LINUX, with a worldwide

network of trusted time sources to be developed) using the existing NTP structure. However, I'm still puzzled as to exactly how GET differs from UTC: if it's GMT with atomic clocks thrown in, surely that's what we already have with UTC?

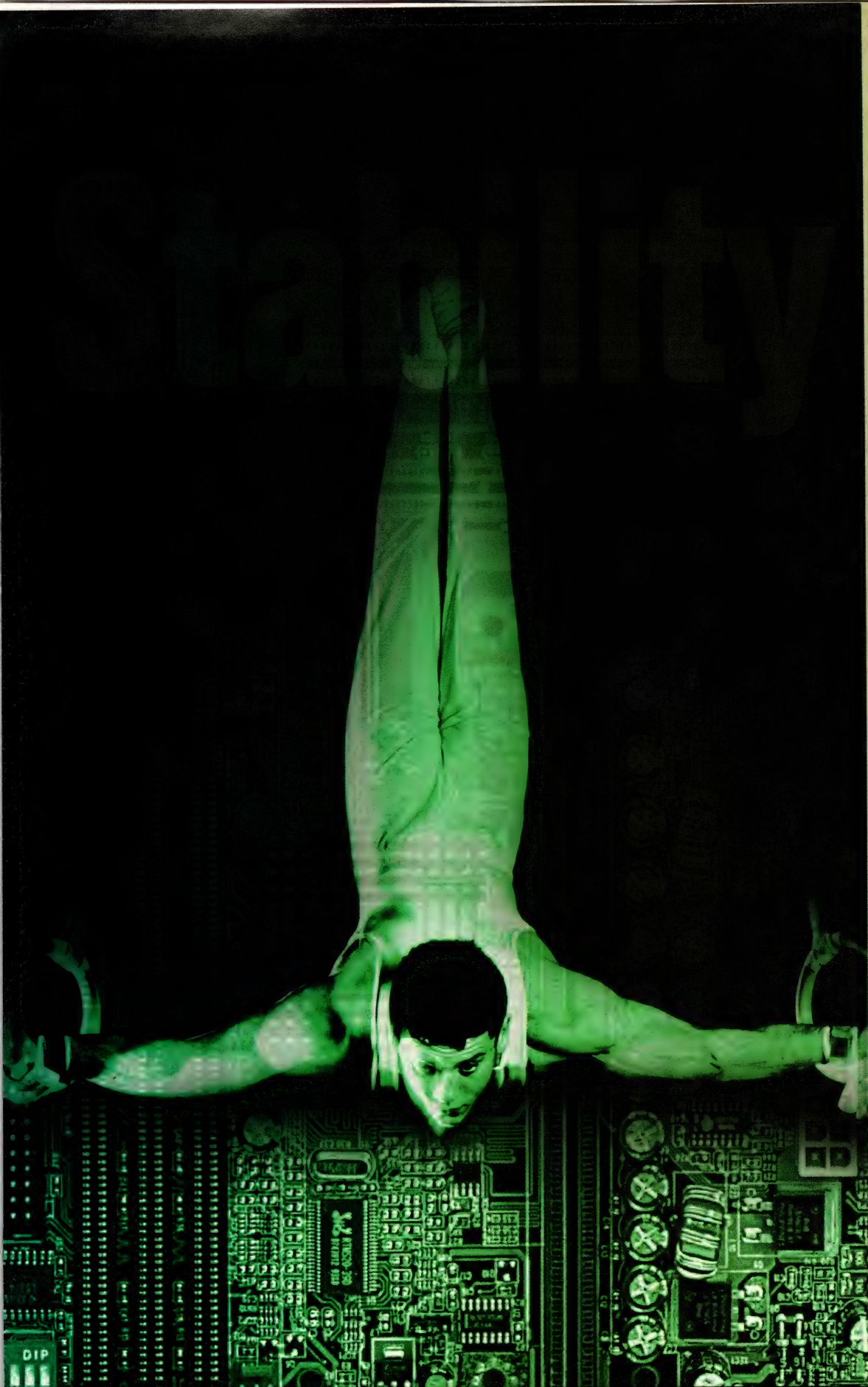
Which is where I start to wonder what it is all really about, as most mail clients worth their salt happily translate the timestamps in the message date header to the user's local time zone using UTC normalisation. The Internet itself already has a workable and proven time server infrastructure in the shape of the Network Time Protocol (NTP) and Simple Network Time Protocol (SNTP). SNTP is primarily used by client machines not requiring an accuracy greater than +/- one second, while NTP is primarily used by servers requiring accuracy within a range of +/- 1-50ms. You can read up on them both in RFC2030 and RFC1305 if you must, but essentially they synchronise the time on your client or server to other servers or accepted reference sources such as radio or satellite receivers.

Swatch, the Swiss watchmaker, launched its own Internet Time standard back in October 1998, and essentially this does away with all time zones and instead divides the Internet day into 1,000 beats. A single beat equals one minute, 24 seconds of real-world time, and because there are no time zones in the Swatch vision of the Internet, wherever it is 12 noon anywhere on the planet the Internet Time would be @500 beats. In order to make all this sound a little more official and serious than it at first sounds, Swatch has established a meridian in Biel, Switzerland (its home town) called Biel Mean Time (BMT), with the line painted on its HQ building. A day in Internet Time starts at midnight BMT or @000 beats. Confused? Join the club. Despite a big PR push at the time and the launch of an Internet Time Swatch watch, this non-standard standard doesn't seem to have caught anyone's imagination. GET looks like merely a similar branding exercise, with a few specially-developed and freely-available trusted timestamp tools thrown in for good measure. But maybe it will fare better - given the heavyweight political and corporate backing it has received so far it ought to. Ultimately though, and excuse the pun, only time will tell.



Davey Winder

Journalist and consultant. Former Technology Journalist of the Year, works from home in rural isolation thanks to the Internet.

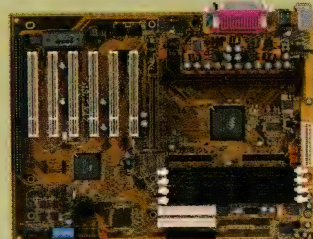


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Game Reserve

This month brings you a healthy dose of strategy with just a dash of blood-soaked action and sporting mayhem.

News

Wargames

Real life has finally got round to copying computer games. US Marine Corps Master Sergeant George Caldwell has plans to incorporate Delta Force 2 as a virtual training tool. Caldwell is quoted as saying 'I hope the Marine Corps will view this as a way of augmenting existing training by utilising the down time that is an ever-increasing factor due to fuel, transport, ammunition, time and training area constraints.' Only in America.

www.novalogic.com

Bleem! vs Sony

The big software publishers have generally turned a blind eye to emulators, until Bleem! came along, which lets you run PlayStation games on your PC.

After a year of attempts by Sony to ban the emulator, Bleem! has counter-sued, claiming, 'Sony's practices are anti-competitive and that it's misusing its copyright and patents.'

www.bleem.com

Hasbro sheds staff

Hasbro Interactive, after shedding over 100 jobs in its US game division, has now posted losses of more than \$US53 million for 1999. The company is continuing to release games, but unless there is a major turnaround in fortunes its future looks uncertain.

www.hasbro.com

Invictus

A strategy game with a heroic motif set in the world of Graeco-Roman mythology, Invictus – which is Latin for unconquered – attempts to merge a fairly equal mix of RPG and RTS elements.

The RPG side of the game is the lead character (you) who builds up a team of hired hands, although the number in your war party is limited to

20 or so. You do the usual RPG things, which involve interacting with NPCs, solving quests, buying and selling goods.

The RTS side is addressed through the combat aspect. The limit on the party size, claims the developer, is to prevent the usual 'might is right' that is the winning formula for games such as Tiberium Sun and Myth II. In Invictus, the aim is to keep your party alive and let them increase their skills in tandem with

your own.

The game will have various unit types, including Amazons (fierce all-round fighters), Gorgons (who turn their opponents to stone), Cyclops (very powerful in melee combat), Centaurs (mobile units who are excellent archers), and many others.

Expect to see Invictus released in Australia within the next few months.

www.interplay.com



Invictus: Build up a team of hired hands.



Invictus: Watch out for the odd pesky dragon.

Hard Corps

This month sees a new development from Brit Soft company Manic Media, which has been remarkably quiet since its last venture Manic Karts – a go-kart sim released about two years ago. Hard Corps is a dramatic

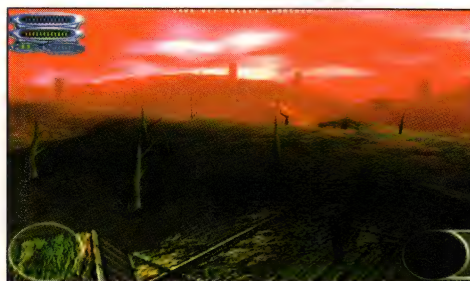
new direction for the company, although the early screen shots indicate that the eye-candy factor should be high.

The game is designed to be a halfway house between Quake III and Starsiege: Tribes and will be predominately played online. Players will log on to the centre planet, where they'll be given the option to customise their player, buy some weaponry and generally tool up, before jumping to eight different planets for a gigantic frag fest.

However, before the game gets accused of being just another Quake clone, the designers have added various puzzles and traps, à la Tomb Raider, giving you access to otherwise unavailable weapons and maybe a hidden arena.

The game is about six months from final beta, but PC Authority was able to get the first international preview. Don't say we aren't good to you.

www.manic.co.uk



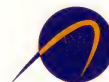
Hard Corps: A war-torn planet wants to hear from you!

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Majesty



Requirements Pentium/166,
32Mb of RAM, Quad-speed CD-
ROM, 2Mb graphics card

Price \$89.95

Supplier Microprose (02) 9953 8788

www.cyberlore.com

The name Majesty conjures up something very English, so it is a bit ironic that the narrator should sound like Sean Connery, a proud Scot and supporter of Scottish independence. Actually, despite the name the game is not very English at all - probably because it was developed by a bunch of Americans who like playing fantasy games.

It is full of heroes, wizards, monsters and villains all of whom roam the ancient land of Arдания, causing chaos for the poor hardworking peasants. You are the sovereign of this unfortunate land and must lead your people on several quests before you can rightfully claim to rule it all. Each quest is a self-contained game that can be played more than once, although never the same way twice.

The aim of the game is to hire heroes to do your kingdom-winning for you, and some of them are real losers. You have little control over their movements, in fact, and if you want them to go and

beat the stuffing out of one of your enemies you have to offer them a reward first, otherwise they will just do their own thing. All of this costs gold which has to be collected by running a marketplace, collecting taxes, or finding treasure.

Of course, being a fantasy game there is plenty of magic and wizards. The heroes have their own spells and you, as sovereign, can gather a few of your own to toss down on the enemy. However, the wizards, monks and other temple dwellers are a pretty weak lot and not cheap. But if you can keep them alive long enough they can be quite effective.

There are some really nasty creatures that are determined to stop you getting your throne. Not only are they mean, but they breed like rabbits, are as aggressive as a boar with a toothache and some have such bad breath that their saliva will eat through armour.

The lack of direct control over the characters takes a bit of getting used to and can be very frustrating for gamers who like to work out the most effective attack strategies. However, attack is not always the best way to win the game and



sometimes you will have to rely on economics rather than ammunition.

The terrain and graphics are similar to those of Age of Empires II, with good sized buildings and easily recognisable characters, while the action is fast and furious - sometimes ridiculously so. Despite this Majesty is a fair contender to AoE II.

David Hellaby

PC AUTHORITY

OVERALL SCORE

000000



Majesty: Control your subjects by paying them.

Age of Wonders



Requirements Pentium/166,
32Mb of RAM, Quad-speed CD-ROM
Price \$89.95

Supplier Jack of All Games (02) 9482 3455

www.ageofwonders.com/

Age of Wonders is a strategy game aimed at those of you who enjoyed titles like Warlords or Heroes of Might and Magic. The game sees you choosing a side in a wide ranging conflict between good and evil, choosing your leading character, and venturing out into the unknown with a relatively small army.

The game is played from an overhead perspective, with individual screens for combat and castle building. The action is turn based, and you will get plenty of combat, castle building and resource management. Just like Heroes of Might and Magic you can upgrade your castles, capture enemy castles, and recruit new creatures into your armies.

Your main character can also find allies to join him along the way, and like many similar games your main characters have abilities which improve as they gain experience in the battlefield.

When compared to the 'Heroes' series Age of

Wonders has a whole lot more features, and generally more depth, and this is a good thing. Not only are the various creatures and heroes you can recruit imbued with a more complex series of special - and often magical - abilities, but the game presents you with other innovations like a magic research and diplomacy system. These touches make Age of Wonders more involved, and certainly more likely to appeal to the experienced fantasy strategy gamer.

Combat is also played out on huge areas, with terrain based obstructions to missile attacks. This is a bit of a double-edged sword. The realistic and larger combat areas leave you room to manoeuvre your forces and seek a strategic advantage - which is good. However this also means that sometimes combat sees you doing a lot of fiddly mucking about as you try and get into a favourable position, and force the enemy to walk into your field of missile fire.

In other words you must be prepared to be patient as there is much combat, and it can be very time consuming. How much you will enjoy the manoeuvring before opening fire depends on individual taste, but this aspect of the gameplay is



AoW: If you can't clobber 'em, blind 'em.

perhaps a little too time consuming.

In other areas Age of Wonders is quite competent. The visuals are crisp, and the audio is also ok. That said the battlefield war-cries can get on your nerves as they are pretty much the same sounds over and over. Age of Wonders is very much a game for the more patient strategy gamers amongst you. However if you do fit the bill you will find this game is generally a winner.

Steve Polak

PC AUTHORITY

OVERALL SCORE

000000

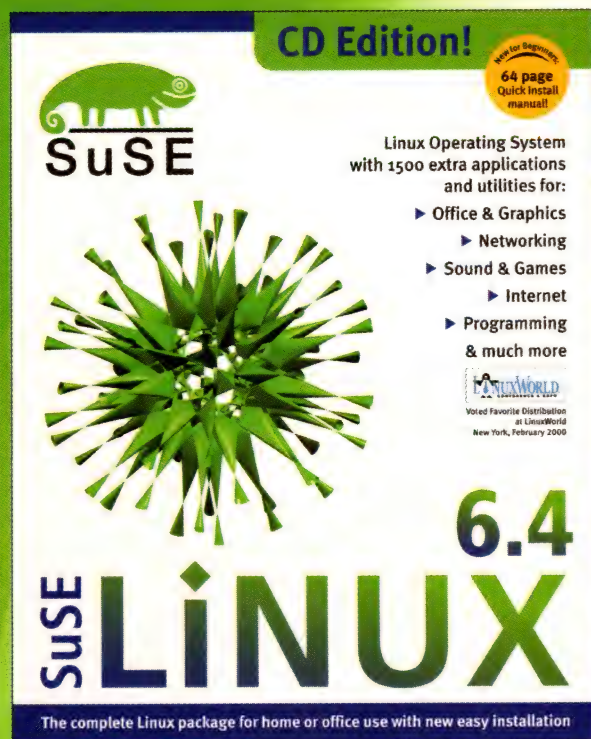
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1602 A.D.



Requirements Pentium/100,
16Mb of RAM, Quad-speed CD-ROM

Price \$79.95

Supplier Ozisoft (02) 9666 0100

www.1602ad.com

At first blush, 1602 A.D. seems to offer so much. With promises of being a 'unique blend' of empire building and real time strategy, this game not only lacks those qualities of its forebears which make them so playable, but also fails to provide anything new to hold your interest.

The game starts well; a ship loaded to the gunwales with the resources necessary to start a new colony awaits your direction to seek out the new world. The resources that you carry on the ship must last until you become self sufficient and there is a delightful tension as resources dwindle and the colony struggles to survive. It is tempting to continue adding to the basic infrastructure of Food and Wood production, but the dwindling Tools are worrying and so you frantically scour the manual, tracing the technology route needed to get your colony to the point of tool production.

At this point the game hits a wall. It turns out that buildings, services and technologies are only made available when your population reaches a certain level. This is not particularly new or



▲ 1602 A.D.: Not the greatest game ever.

troublesome, except that by the time your population has reached a level where you have the technology to produce tools, you no longer have the resources to build the structures needed to do so. Instead, you must wait for your 'opponents' to trade or sell the necessary material to you. Unlike other resource management games, the computer does not seem limited to only those resources visible on the map. Buildings spring up according to a time frame divorced from your own struggle for resources until it has the resources for sale that you need to continue.

This may seem like a wonderful idea, forcing game play towards co-operation, at least initially, and away from the more immediate aggression of

other real time strategy games. However, the frustration of waiting for your multiplayer opponent to reach a particular point whilst you can do nothing is frustrating and, frankly, boring.

These flaws in the resource management aspects of the game could be ignored if the strategy or tactical elements were stronger. Alas, there are a handful of ships, distinguishable from each other only in the number of cannon that they can carry, and a similar number of troop types. A few buildings lend themselves to combat and that is all. There is nothing to distinguish your opponent from you, except the colour of their flag and the opportunity to cast different factions after historical colonial powers is missed.

In short this game looks pretty, but fails in nearly every other aspect of game play or usability. It is frustrating, repetitive, lacks any distinction between opponents, has little or no depth, no real story amongst the campaign play and I have no idea how multiplayer is possible, given the reliance on the computer's infinite resources to kick start your own colony. A disappointing game that looked so good at first.

Lachlan Murray

PC AUTHORITY

OVERALL SCORE

8

Risk II



Requirements Pentium/166,
32Mb of RAM, Quad-speed CD-ROM

Price \$69.95

Supplier Hasbro

<http://www.hasbro.com>

The original Risk is one of my favourite board games. The basic game is set during the 1800s and you have to engage in inter-border warfare with a number of other nation states as you try to conquer the globe.

The gameplay is simple. You have a number of military units, and you get to allocate them to the various countries that are a part of your empire. You must make sure that the countries on the outer borders of your realm are better garrisoned with troops, so as to protect against attack. Stationing your troops on the edge of your empire is also useful in that it helps you to launch offensives against your enemies.

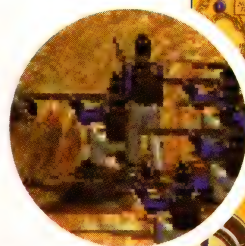
This is very easy to do in Risk II. You simply click on the group of troops which you are going to use in an attack, and then click on the country you wish to invade. The computer then processes the result,

and there you have it. Combat is presented using a pretty 3D map, which doesn't add a lot to gameplay, but looks nice anyway.

However you will not always win every battle, as the roll of the dice helps to add a 'random' element which can see you losing engagements even if you have an overwhelming numerical superiority. This can also work to your favour too as it is immensely satisfying to repel an invading army with a much weaker force.

The game sees you building your military might by acquiring territory. The more territory you occupy, the greater your economic power, and the more reinforcements you will get when it is next your move.

However you must be very careful in Risk, as you can over extend yourself in attack, leaving you with a huge area to defend, a depleted army, and an enemy poised to take back all of your newly won territories. It is wiser to attack judiciously, leaving your armies with sufficient strength to defend your newly acquired lands. Balancing attack and defence this way is what Risk II is all about, and even though this



▲ Risk II: Like the board game but without the mess.

seems quite simple on the surface, there is enough depth in the game to keep fans of the original board game coming back for more.

There could have been a few more play options to keep more advanced gamers coming back, but Risk II does have an instant 'pick up and play' appeal which is just perfect for strategy fans who feel like a quick bash.

Steve Polak

PC AUTHORITY

OVERALL SCORE

9

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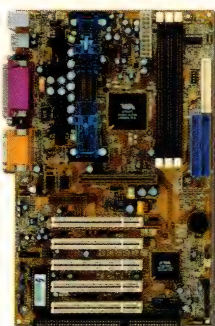


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VIA KX133

AGP 4X

FSB 200 MHz



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- Ultra ATA/66
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- BIOS Writing Protection
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Soltek SL-77KV vs. Asus K7M...

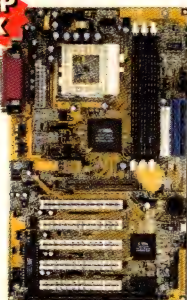
Test Item	Soltek SL-77KV	Asus K7M
BAPCO SYSmark2000	111	112
Content Creation Winstone 2000	22.8	23.8
WinBench 99 1.1 Hi-End Disk Winmark	12400	12000
Quake3:Normal Quality (1024X768)	79.3	75.10
Quake3:High Quality (1024X768)	61	56.2

Testing Environment
CPU:AMD Athlon 500
Memory:KingMax 128MB SDRAM
VGA:Creative GeForce 256 Pro Direct7.0a
16bit true color
Solution:1024X768
Frequency:75Hz
Hard Disk:IBM DJNA-371350 13.5 GB
CDROM:TEAC 32X CDROM
OS:Windows98 SE4.10.2222A
Source:PC SHOPPER (2000.3/NO.16)

AGP 4X

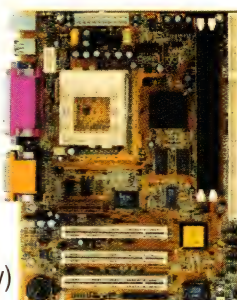
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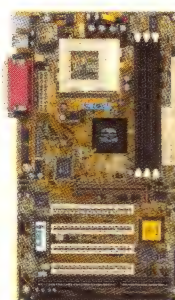
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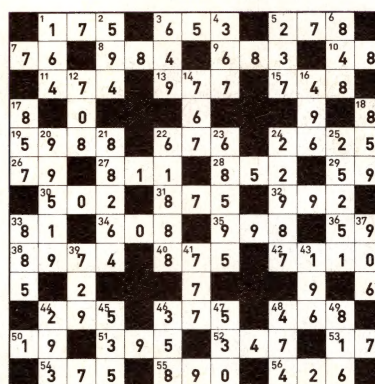
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- 4 A prime number
- 6 60 across times two down
- 9 60 across minus 40
- 10 22 across + 23 down - 17
- 12 19 down + 28 down + 18
- 14 Factor of 58 across
- 15 45 down + 17 down - 46
- 16 52 across + 57 down + 35
- 18 57 down times seven
- 20 25 down plus 19558
- 22 Factor of 37 down
- 24 28 across plus 857
- 26 56 across times two down
- 28 11 down + 30 down + 65
- 29 62 across + four across + 16
- 31 43 across + 12 across - 390
- 33 Three times 14 across
- 34 55 down minus 111
- 35 One across minus fifty-five
- 38 21 down + 33 across + 28
- 40 60 across times 19 down
- 43 61 across minus eleven
- 45 15 down minus 181
- 46 40 across divided by 11
- 47 27 down minus 3787
- 50 10 across minus 42
- 52 28 across times three
- 54 Eight down plus 38 across plus 411
- 56 Two down plus 14
- 58 Two times 39 down
- 59 36 down plus 70
- 60 12 across divided by six
- 61 15 times 34 across
- 62 37 down divided by eight
- 63 49 down plus 60 down plus 111

Down

- 1 55 down times eight
- 2 A prime number
- 3 53 down plus 64
- 4 41 down plus 116
- 5 Six across plus 15 across plus 224
- 6 Four across minus 32
- 7 Factor of 18 across
- 8 41 down minus 39
- 11 26 across plus 32
- 13 One down plus 139
- 15 46 down + 50 across + 273
- 17 26 across minus seven
- 19 A square number
- 21 29 across plus 33
- 23 35 across divided by nine
- 25 51 down plus 42793
- 27 63 across plus 19487
- 28 56 across times five
- 29 46 across plus 60
- 30 Two times 32 down
- 32 A prime number
- 36 32 down minus 195
- 37 A cube
- 39 A square number
- 41 Five times 28 down
- 42 35 across divided by thirteen
- 44 61 across plus 4 down minus 61
- 45 28 down times two down
- 46 16 across plus 39 down minus 423
- 48 13 down plus 274
- 49 44 down plus 22
- 51 Five down plus 28
- 53 59 across plus 14 across plus 16
- 55 40 across divided by 11
- 57 56 across minus 13
- 60 Seven down plus 56 across plus one

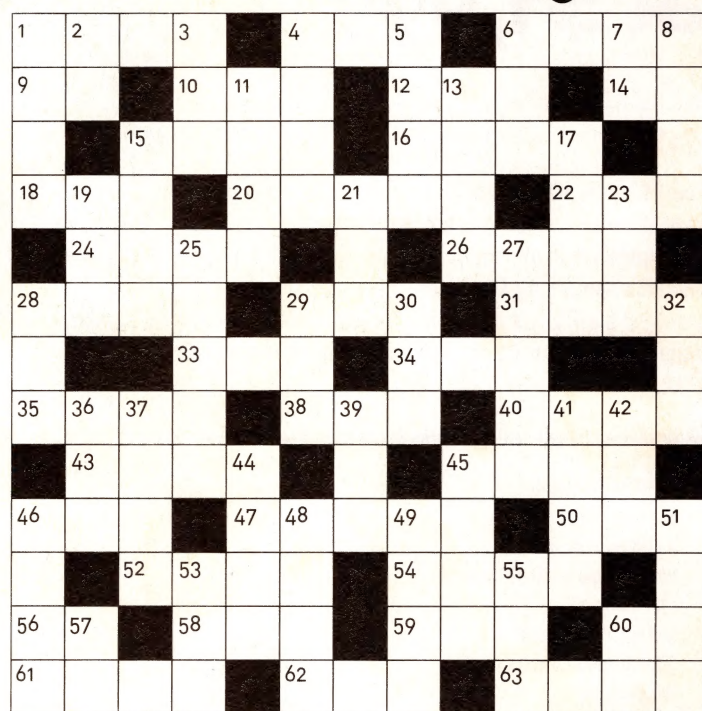


Issue 29 solution

Competition rules: Every month all correct solutions received will be entered into a prize draw and the sender of the first solution drawn will receive the prize. The editor's decision is final.

No correspondence will be entered into and the winner will be notified by post. The competition is not open to employees of AJB Publishing or participating companies. No cash alternative will be offered. Submission of entry will be taken as acceptance of the rules.

NB No purchase of the magazine is necessary. Further copies of the puzzle are available on receipt of a stamped addressed envelope. You may photocopy this puzzle.



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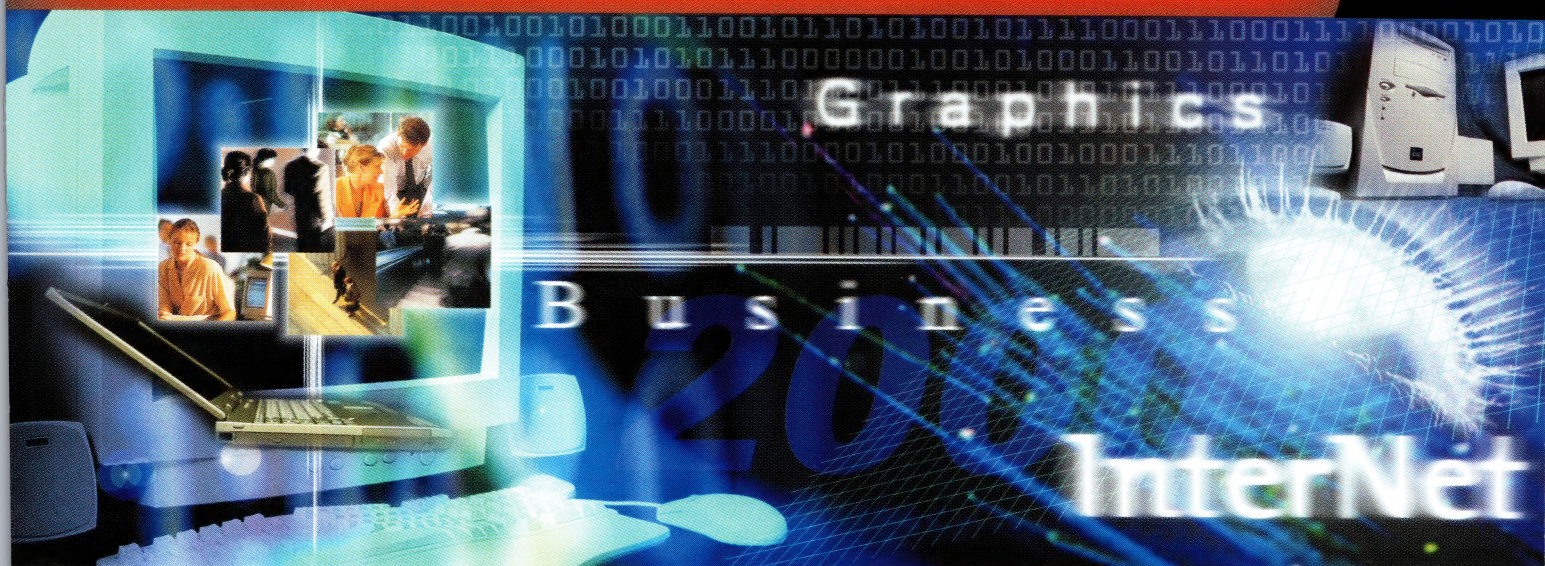
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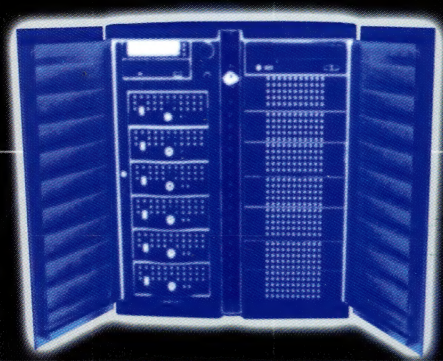
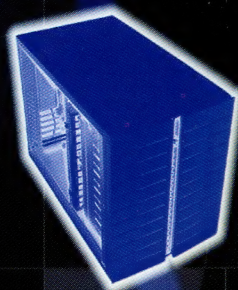
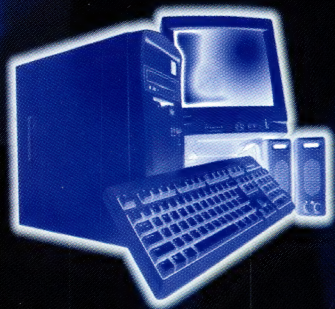
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